

HOW DO JOB DEMANDS COMPARE
BETWEEN JOBS PERFORMED BY THE
BLIND AND OTHER SEMI-SKILLED
OCCUPATIONS

by

W. EARL QUAY



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HOW DO JOB DEMANDS COMPARE BETWEEN JOBS
PERFORMED BY THE BLIND AND OTHER
SEMI-SKILLED OCCUPATIONS

An abstract of a thesis submitted to the Graduate Council of Wayne University in Partial Fulfillment of the Requirements for the Degree of Master of Education in the School of Education, by W. Earl Quay, Harrisburg, Pennsylvania, 1952.

This study has been made for the purpose of determining whether there exists a noteworthy difference in job demands in connection with work traditionally performed by the blind as compared with the demands of jobs in general industry. This is done to show whether or not employment, training and job sampling for blind people in special workshops places the blind workers under particular disadvantages due to the nature of the work.

To accomplish this, United States Employment Service Job Analyses, when available, were obtained on all jobs similar in nature to those traditionally performed by the blind. Another group of analyses were obtained from the U.S.E.S. which were chosen at random from the list of semi-skilled occupations listed in the Dictionary of Occupational Titles. (These two groups are referred to as "jobs performed by the blind" and "jobs performed in general industry"). The group of jobs from general industry was limited to the semi-skilled manufacturing classification because all of the jobs performed by the blind similarly fell into that same class.

Four comparisons were made directly from the U.S.E.S. activities requiring heavy expenditures of energy as compared

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job analysis check sheets. Physical Demands, Working Conditions, Worker Characteristics and Learning Time were charted and compared. These comparisons provided group information only. Statistical data were compiled from the material obtained from the comparisons and were gathered to show similarity or dissimilarity of job demands in connection with the two groups. To gain a comparative numerical value for all of the jobs performed by the blind for matching against a general overall score for jobs from general industry, six judges, experienced in job evaluation, rated each job according to a point system. Eight factors were used in the evaluation: Experience, Education or Trade Information; Initiative and Ingenuity; Mental or Visual Demand; Physical Demand; Spoilage of Materials; Work of Others; and Hazards to Self. The pooled judgment of the six evaluators was matched against a produced constant for jobs in general industry to gain a numerical comparison for each of the jobs in the group performed by the blind.

The group comparison of physical demands, taken from the U.S.E.S. check sheet, shows that work performed by the blind requires a lesser amount of strenuous physical activity and that a wider range of physical activities are required.

The arithmetic mean of physical activities required on jobs performed by the blind is 4.5 as compared to 3.7 in connection with the random selection in industry. Thirty-five percent of the markings pertaining to jobs done by the blind indicate activities requiring heavy expenditures of energy as compared

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The group comparison of physical demands, taken from the U.S.E.S. check sheet, shows that work performed by the blind requires a lesser amount of strenuous physical activity and that a wider range of physical activities are required. The arithmetic mean of physical activities required on jobs performed by the blind is 4.5 as compared to 5.7 in connection with the random selection in industry. Thirty-five percent of the machines pertaining to jobs done by the blind indicate activities requiring heavy expenditures of energy as compared

with 57% in general industry.

The comparison of working conditions shows that conditions surrounding the jobs performed by the blind are somewhat more favorable than those surrounding the jobs in general industry. The average number of conditions chosen as ones which might involve unpleasant, hazardous or efficiency-reducing surroundings, appearing in connection with jobs in general industry is 2.0 as compared to 1.2 for jobs done by the blind. This may be of little significance since the working conditions check sheet was incomplete in many of the analyses and since many of the jobs performed by the blind had quite long lists of unpleasant, hazardous or efficiency-reducing working conditions. Thirty-six percent of the markings involved in jobs done by the blind would indicate efficiency reducing conditions, while 53% of the markings pertaining to jobs in general industry indicate such conditions.

On the assumption that a job requiring a greater number of characteristics to a higher degree requires a higher quality worker, the worker characteristics material was compared. It indicates that more versatile or more skilful workers are required on the jobs performed in general industry. When point values are assigned to the degree markings in connection with worker characteristics on the analyses, scores for the two groups of jobs can be compared. The average score for jobs performed by the blind is 35.5 by the blind range from minus 44.3 to plus 80.4. When the

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analyses, scores for the two groups of jobs can be compared.

The average score for jobs performed by the blind is 35.5

while the average score for jobs from general industry is 42.5. The overall average is 38.3. Following listed values:

Learning time is a factor in the measurement of skill in all job evaluation. When the listed learning time or required experience for the two groups of jobs is compared, it shows that the jobs performed by the blind require an average time of 15.4 months experience before efficient production can be expected. The learning time on the jobs from general industry is 11.3 months. Using learning time as a measurement of skill and comparing it to worker characteristics, both measurements taken directly from U.S.E.S. Analyses, we find that the two measurements of skill are in disagreement.

In addition to the findings taken directly from the U.S.E.S. material, a more exact and more substantial measurement of the job demands was gained through a point system rating of all of the jobs studied. Accompanying each list of tabular information in the U.S.E.S. analyses, full narrative job descriptions are provided. These narrative descriptions, of the same two groups of jobs, were used by judges in setting point values. From the data provided by the judges, the point system evaluation showed an average point value of 129.1 for the jobs performed by the blind and 132.1 for jobs in general industry.

When the average point rating for jobs in general industry is used for a norm, the individual jobs performed by the blind range from minus 44.3 to plus 50.4. When the

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Learning time is a factor in the measurement of skill in all job evaluation. When the listed learning time or required experience for the two groups of jobs is compared, it shows that the jobs performed by the blind require an average time of 15.6 months experience before efficient production can be expected. The learning time on the jobs from general industry is 11.8 months. Using learning time as a measurement of skill and comparing it to worker characteristics, both measurements taken directly from U.S.E.S. analyses, we find that the two measurements of skill are in disagreement.

In addition to the findings taken directly from the U.S.E.S. material, a more exact and more substantial measurement of the job demands was gained through a point system rating of all of the jobs studied. Accompanying each list of tabular information in the U.S.E.S. analyses, full narrative job descriptions are provided. These narrative descriptions, of the same two groups of jobs, were used by judges in setting point values. From the data provided by the judges, the point system evaluation showed an average point value of 122.1 for the jobs performed by the blind and 122.1 for jobs in general industry.

When the average point rating for jobs in general industry is used for a norm, the individual jobs performed by the blind range from minus 44.5 to plus 50.4. When the

jobs studied are arranged into general groups, these groups compare to the norm according to the following listed values:

<u>Industry</u>	<u>Mean Point Value</u>	<u>Deviation from mean of Industry(132.1)</u>
Mattress Making	143.2	11.1
Basket Making	140.1	8.0
Broom Making	121.9	-10.2
Machine Sewing	121.3	-10.8
Chair Caning	117.7	-14.4
Mop Making	108.4	-23.7

These studies are arranged into general groups, those known to be related to the following listed values

Industrial Group	Total Value	Industry
1.11	2.22	Manufacturing
1.11	1.11	Transportation
1.11	1.11	Communication
1.11	1.11	Electricity
1.11	1.11	Gas
1.11	1.11	Water
1.11	1.11	Other

**HOW DO JOB DEMANDS COMPARE BETWEEN JOBS
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A THESIS

**SUBMITTED TO THE GRADUATE COUNCIL OF WAYNE UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF EDUCATION
IN THE
SCHOOL OF EDUCATION**

BY

W. EARL QUAY

Harrisburg, Pennsylvania

1952

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ARTICLE I

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PREFACE

This study is presented primarily for use by workers in work for the blind whose responsibility it is to help with the transfer of blind workers from special workshops to employment in general industry. In working in just such a capacity, the writer often was disturbed by the question of the comparability of job demands. It is hoped that this study will provide a tool with which easier estimates of worker transferability can be made and that it will lead to further research toward the development of this untouched field.

Without the assistance of many individuals, the preparation and completion of this study would not have been possible. Joseph L. Defuge, Occupational Analyst, Pennsylvania State Employment Service, was instrumental in gaining from the Washington Office of the United States Employment Service, the analysis material used and he also served as one of the job evaluators, helping to judge the narrative descriptions for point evaluations.

Dr. Lester W. Eyer, Chief of Special Education, Department of Public Instruction, State of Pennsylvania, gave freely of time and counsel in criticizing work as it progressed.

Oscar Kurran, Supervisor of Rehabilitation Services, Pennsylvania State Council for the Blind; Charles Eby, Chief of Operations, Pennsylvania State Board of Vocational Education; William Murray, Executive Director, Pennsylvania

This study is presented primarily for use by workers in work for the blind whose responsibility it is to help with the transfer of blind workers from special workshops to employment in general industry. In working in just such a capacity, the writer often was disturbed by the question of the comparability of job demands. It is hoped that this study will provide a tool with which certain estimates of worker transferability can be made and that it will lead to further research toward the development of data concerning this field.

Without the assistance of many individuals, the preparation and completion of this study would not have been possible. Joseph L. Deane, Occupational Analyst, Pennsylvania State Employment Service, was instrumental in gaining from the Washington Office of the United States Employment Service, the analyzed material used and he also served as one of the job evaluators, helping to judge the narrative descriptions for point evaluations.

Dr. Lester H. Weyer, Chief of Special Education, Department of Public Instruction, State of Pennsylvania, gave freely of time and counsel in critiquing work as it progressed.

Great thanks, Supervisor of Rehabilitation Services, Pennsylvania State Council for the Blind; Charles W. Chief of Special Education, Pennsylvania State Board of Vocational Rehabilitation; Executive Director, Pennsylvania

Association for the Blind, Beaver Falls, Pa., and the following individuals from the Aircraft-Marine Products, Inc., Edward Warren, Supervisor of Employment; Ned Rosen, Job Analyst; and Richard Farley, Supervisor of Wage and Salary Administration, gave of their time and experience to do the evaluation for point rating. The sixth job evaluator, not mentioned previously, was the writer.

In reading the abundance of material, the typing and final preparation of this study, Mrs. W. Earl Quay, was indefatigable.

Appreciation and credit is offered to all these individuals for their freely given help and guidance.

This study is dedicated to those whose path might be smoothed toward successful industrial employment.

W.E.Q.

Association for the Blind, New York, New York

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CHAPTER I

INTRODUCTION

While working in and around workshops for the blind and also in and about manufacturing establishments, the writer was attracted by the apparent difference in the degree of skill required in the performance of jobs done by the blind as compared to those in general industry. It seemed that the jobs that are traditional in special workshops for the blind were far more difficult than those most frequently seen in factories generally. Assuming that this difference exists, then blind people, in their effort to gain a livelihood, have a double handicap. The blind workers are initially handicapped by their blindness and again handicapped by the nature of their work. The purpose of this study is to discover whether or not there is an important difference in the job demands in work done in special workshops for the blind, as compared to the job demands found in general industry.

In observing jobs in workshops for the blind, we see work like basketry, broom winding, mop sewing and chair caning. All of these jobs require a rather nice control of materials and/or tools. No worker, blind or sighted, can do the job without careful training. Workers are often responsible for spoilage of expensive work units; the physical demands are relatively high; the work cycles are long. All aspects of work candidates are given jobs in the workshops where they the jobs seem to indicate high job demands.

In manufacturing generally, jobs such as, inspector,

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difference in the job demands in work done in special work-
shops for the blind, as compared to the job demands found
in general industry.

In observing jobs in workshops for the blind, we see work
like assembly, dress making, copy setting and chain making.
All of these jobs require a rather nice control of materials
and/or tools. No worker, blind or sighted, can do the job
without careful training. Workers are often responsible for
expensive or expensive work units; the physical demands are
relatively high; the work cycles are long. All aspects of
the jobs seem to indicate high job demands.

In manufacturing generally, jobs such as, inspector,

turret-lathe operator, and chucking machine operator, are found. These all have the appearance of being short cycle jobs requiring little skill and involving no training worth the mention. The apparent dissimilarity between jobs observed in workshops for the blind and those in general industry would be of utmost importance when pre-vocational training of blind workers is given, under conditions existing in special workshops, with a goal toward transfer of the blind workers to general industry.

The ultimate goal in employment of the blind is to have them all take a place in general employment rather than in industries especially created for employment of the blind. Since they represent a cross section of the population, many would find employment in industrial work. Because of the repetitive nature of semi-skilled occupations in manufacturing, jobs of this type are well suited to blind workers. This latter thought is borne out by the fact that special workshops for the blind, with no notable exceptions, engage in manufacturing and that jobs done by the blind workers fall into the semi-skilled class. For this reason this study is confined to a comparison of "semi-skilled" occupations.

In the preparation of blind people for industrial placement outside of workshops for the blind, preplacement training is most frequently given in the special workshops. Placement candidates are given jobs in the workshops where they develop manipulative skills and work tolerance. If jobs traditionally done by the blind are more difficult, placement

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candidates who make poor showings in the job tryouts might still be capable of satisfactory performance when they are transferred from the special workshops to general employment.

In the verification of results of testing and guidance, work tryouts are given to blind placement candidates in the workshops for the blind. Sample or regular production jobs are given to the candidates, while their suitability for placement is judged from their performance. If there are important differences in the demands placed upon workers when they perform work which is traditionally done by the blind as compared to demands in regular employment, then job tryouts in special workshops would give false impressions of the ability of the blind person.

This comparative study of semi-skilled occupations is done to discover similarity or dissimilarity of the job demands. The following conditions indicate that such a comparison is needed:

1. The ability of a large number of the blind to earn a livelihood depends upon work available in special workshops.
2. Their ability to earn depends upon job demands.
3. Much of the evaluation of workers' abilities and preplacement training leading toward outside placement is done in workshops for the blind.
4. Worker transferability from workshops to outside employment is dependent upon similarity of work demands.
5. Jobs done by the blind in special workshops are classifiable as semi-skilled occupations.

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1. The ability of a large number of the blind to earn a livelihood depends upon work available in special workshops.
2. Their ability to earn depends upon job demands.
3. Much of the evaluation of workers' abilities and placement training leading toward outside placement is done in workshops for the blind.

4. Worker transferability from workshop to outside employment is dependent upon similarity of work demands.
5. Jobs done by the blind in special workshops are classified as semi-skilled occupations.

6. The same class of work would be suitable and would be sought for a large number of blind people in outside industries.

7. Since some question exists regarding comparability of job demands inside and outside of special workshops.

8. Since earnings, training, testing and transferability all depend upon the job demands.

To discover comparisons of job demands, exclusive use is made of material borrowed from or published by the United States Employment Service. This is done since it is the only known source of descriptive material which similarly treats jobs traditionally performed in workshops for the blind, as well as other semi-skilled manufacturing jobs.

Two selections of jobs are made: (1) Listings of jobs found in the Dictionary of Occupational Titles¹ which can be matched with those done by blind workers in special workshops. The selection was made by searching carefully through the Dictionary of Occupational Titles to discover every single job which is typical in workshops for the blind on which a U.S.E.S. Job Analysis was available; and (2) A random selection taken from the Dictionary of Occupational Titles of semi-skilled manufacturing jobs. The random selection was made by listing the first job appearing on every second page of the dictionary, when these were available.

Four comparisons are made directly from the U.S.E.S.

¹U. S. Department of Labor, Dictionary of Occupational Titles, Part II, Group Arrangement of Occupational Titles and Codes (Washington, D. C.: Government Printing Office, 1939)

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8. Since earnings, training, testing and transferability all depend upon the job demands.

To discover comparisons of job demands, analysis was made of material reported from or collected by the United States Employment Service. This is done since it is the only known source of descriptive material which adequately presents job traditionally performed in workshops for the blind, as well as other semi-skilled manufacturing jobs.

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Four comparisons are made directly from the U.S.E.S.

Analyses: (1) Physical Demands, (2) Working Conditions, (3) Worker Characteristics, and (4) Learning Time. Material from analyses of all the jobs covered, which are done by the blind, was gathered, while a similar composite of data on the jobs performed in industry is made and the two are compared to demonstrate similarities or differences.

Using job descriptive material from the same U.S.E.S. Job Analyses, a ranking is made which includes all of the jobs in the two previously mentioned groups. Responsible judges, experienced in job analysis, have assisted in the job ranking. The judges have been chosen from industry; The United States Employment Service; Pennsylvania State Board of Vocational Education; and qualified personnel in work for the blind. The ranking is based on (a) the degree of skill required, (b) degree of effort, (c) responsibility, and (d) working conditions. These are broken down into the following elements.

SKILL

- Experience
- Education or Trade Information
- Initiative and Ingenuity

EFFORT

- Mental or Visual Demand
- Physical Demand

RESPONSIBILITY

- Spoilage of Materials
- Work of Others

WORKING CONDITIONS

- Hazards to Self

After the completion of the comparisons and rankings,

Analysis: (1) Physical Demands, (2) Mental Demands, (3) Social Demands, (4) Work Environment, and (5) Learning Time. Material from analysis of all the jobs covered, which are shown by the blind, was gathered, while a similar composite of data on the jobs performed in industry is made and the two are compared to demonstrate similarities or differences.

Using for descriptive material from the same U.S.S. Job Analysis, a ranking is made which includes all of the jobs in the two previously mentioned groups. Responsibilities, responsibilities in job analysis, have resulted in the job ranking. The jobs have been chosen from industry; The United States Employment Service; Pennsylvania State Board of Vocational Education; and qualified personnel in work for the blind. The ranking is based on (a) the degree of skill required, (b) degree of effort, (c) responsibility, and (d) working conditions. These are broken down into

the following elements.

- SKILL
 - Experience
 - Education or Trade Information
 - Initiative and Ingenuity
- EFFORT
 - Physical Demand
 - Mental or Visual Demand
- RESPONSIBILITY
 - Supervision of Workers
 - Work at Home
- WORKING CONDITIONS
 - Exposure to Heat

After the completion of the comparison and analysis.

an attempt is made to gather from the data an idea of the real similarity or difference between jobs performed by the blind in special workshops and jobs performed in general industry.

The first step in the analysis of the data is to determine the nature of the jobs performed by the blind in special workshops and in general industry. This is done by a detailed study of the job descriptions and the requirements of the jobs. The next step is to compare the jobs performed by the blind in special workshops with the jobs performed in general industry. This is done by a detailed study of the job descriptions and the requirements of the jobs. The final step is to draw conclusions from the data. This is done by a detailed study of the job descriptions and the requirements of the jobs.

In the second step of the analysis, the jobs performed by the blind in special workshops are compared with the jobs performed in general industry. This is done by a detailed study of the job descriptions and the requirements of the jobs. The next step is to draw conclusions from the data. This is done by a detailed study of the job descriptions and the requirements of the jobs. The final step is to draw conclusions from the data. This is done by a detailed study of the job descriptions and the requirements of the jobs.

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the blind in special workshops and jobs performed in general

industry.

The data in Table 1 are arranged in two columns. The first column contains the names of the jobs performed by the blind in special workshops. The second column contains the names of the jobs performed in general industry. The jobs are listed in order of their importance to the economy. The first column is headed "Special Workshops" and the second column is headed "General Industry". The jobs are listed in order of their importance to the economy. The first column is headed "Special Workshops" and the second column is headed "General Industry".

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CHAPTER II

MATERIAL USED IN EVALUATION

Job Descriptive Material

The "U.S.E.S." as referred to in this paper, is the United States Employment Service of the Department of Labor, Washington, D. C. Job Analysts, of the U.S.E.S., working from their local or affiliated state offices, visit plants to make detailed analyses of jobs. They must gain knowledge of the character of jobs and the required abilities of workers to perform them. This information must be gained in order that the Placement Service of the U.S.E.S. might match the abilities of work applicants with proper occupations. The analyses which are made, although primarily for matching men with occupations, serve well for our purpose of comparing job demands. Thus, the U.S.E.S. analysis material is used throughout this study.

In the attempt to gain acquaintance with jobs, the analyst makes a detailed report of his observations on check lists to show physical demands, working conditions and worker characteristics. He also prepares a narrative description of the job. He gives an estimate of experience required of workers for placement on the job. He, at all times, makes his decisions without reference to the worker on the job. Rather, the analyst tries to set down conditions and requirements as they would apply to any worker.

One must be careful to differentiate job analysis from worker analysis. This is not always easy to do. In worker analysis one studies the workers who are performing jobs to discover the character-

RESEARCH IN RECRUITMENT

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The must be careful to differentiate job analysis from other analysis. This is not always easy to do. In other analysis one studies the workers and the job to discover the character-

istics the workers themselves possess. This may be by an interviewing, testing or other examining technique. In job analysis one will observe workers but he is seeking information about the job primarily and not about the workers who are presently employed in it.¹

Judgments of an individual analyst are subject to human error to a greater degree than would be true in committee or consultative group analysis and his judgment may be warped by considerations of the worker on the job or momentary conditions.

Some of the analyses used in this study date back to 1935. Observations made by analysts at that time, although correct then, may be questionable now. Some of the analyses appear to have been done carefully, thoroughly and completely by well-informed analysts. Others take on the appearance of having been hurriedly and thoughtlessly done. With the wide variance in workmanship of analysts and the lapse of time since the analyses were made, accuracy in a study of this nature is seriously hampered.

Job descriptions in the form of complete published text are not available on any of the jobs which have been analyzed. The analyses obtained for use in this study from the U.S.E.S. were the originals completed by the analyst in the field. These original analyses were obtained through the Harrisburg Office of the Pennsylvania State Employment Service, from Washington, D. C. On most jobs, the only published material

¹Carroll L. Shartle, Occupational Information (New York: Prentice-Hall, Inc. 1946), p. 13.

factor the workers themselves possess. This may be by an individual, feeling or other examining conditions. In the analysis one will observe whether or not the existing information about the job is sufficient and not about the workers who are presently employed in it.

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available was the brief description in the Dictionary of Occupational Titles.¹

Even in the form of unpublished job analyses, material was available on a surprisingly small number of specifically requested jobs and those which were available were sometimes only partially completed. Of the jobs done by blind people, many of the job analyses were made on jobs of similar character, reducing the range of usefulness of the study and reducing accuracy. The analyses obtained on jobs which might be performed by blind people were sometimes made in workshops for the blind. The analyses should be the same whether observations were taken in workshops where blind people were employed or where seeing people were employed since it is the job which is being analyzed and not the worker.

Of the hundreds of jobs done by blind workers, only thirty-four completed job analyses were available and, of these, only six industries were represented; i.e., caning, basketry, mattress making, broom making, mop making and machine sewing.

A complete list of jobs "performed by the blind" with identifying schedule numbers and brief descriptions appears in Appendix A, Page 82. In this list the several schedule numbers indicate a different job performed under different circumstances and in another location.

¹U. S. Department of Labor, Dictionary of Occupational Titles, Part II, Group Arrangement of Occupational Titles and Codes (Washington, D. C.: Government Printing Office, 1939)

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machine sewing.

A complete list of jobs "performed by the blind" with identifying numbers and brief descriptions appears in Appendix A, Page 22. In this list the several schedules numbers indicate a different job performed under different circumstances and in another location.

U. S. Department of Labor, Division of Investigation
Office of Research and Statistics
 and Office of Vocational Rehabilitation
 (1933)

In addition to the jobs "performed by the blind", a random selection was made of jobs found in general industry. Throughout this study these jobs, selected at random, are referred to as "performed in general industry". The selection was made by electing to use the first job mentioned on every second page of the Dictionary of Occupational Titles¹ listing of "semi-skilled" occupations. Of the many analyses requested, only thirty-one were available to be used for purposes of comparison. The total list of jobs with identifying schedule numbers and a brief description appears in Appendix B, Page 86.

Job Ranking Systems

The four basic systems of job evaluation are the Job Classification System, the Ranking System, the Factor Comparison System, and the Point System. The two first mentioned systems are nonquantitative and thus can have application only in limited situations where all jobs analyzed are known to the analyst and where no information is to be transferred outside of a local situation.

The Job Classification System is a method wherein jobs in a plant are divided into large groups or classes. Salary grades are constructed around the several classifications of jobs. With this method of evaluation it is necessary that the analyst be familiar with all of the jobs in a

¹Dictionary of Occupational Titles, U. S. Dept. of Labor, op. cit., p. 115-204.

In addition to the jobs "perturbed by the blind", a random selection was made of jobs found in general industry. Throughout this study these jobs, selected at random, are referred to as "perturbed in general industry". The selection was made by checking to see the first job mentioned on every second page of the Dictionary of Occupational Titles, listing of "semi-skilled" occupations. Of the many analyses requested, only thirty-one were available to be used for purposes of comparison. The total list of jobs with identifying schedule numbers and a brief description appears in Appendix B, page 66.

Job Analysis Systems

The four basic systems of job evaluation are the Job Classification System, the Ranking System, the Factor Comparison System, and the Point System. The two first mentioned systems are nonquantitative and thus can have application only in limited situations where all jobs analyzed are known to the analyst and where no information is to be transferred outside of a local situation. The Job Classification System is a system wherein jobs in a plant are divided into large groups or classes. Jobs within the groups are compared within the several classifications. With this method of evaluation it is necessary that the analyst be familiar with all of the jobs in a

plant and that the jobs classified be somewhat similar in nature. The system permits no accurate evaluation without collaboration among analysts and it provides no adequate means of comparing dissimilar jobs.

The Ranking System is a part of the more complicated systems and differs from the further developed methods only in that factors or components are disregarded and the job is considered as a unit while no attempt is made to limit degrees. This method is often referred to as the "card shuffling system". Jobs are merely arranged in order of their considered order of difficulty. The weakness lies in the fact that ranking of dissimilar jobs becomes virtually impossible.

The Factor Comparison System is probably the most accurate method involving no arbitrary standards of measurement and no predetermined factors or limitations. Although this method of analysis provides a point by point ranking of each job against factors found to be important under particular conditions and according to scales developed for particular situations, the method cannot be applied in this study because of inability to gain collaboration between analysts and because of inadequate data for use in development of a yardstick.

The Point System is chosen for use here for two important reasons. The method provides measuring yardsticks which have been statistically developed against large

and that the jobs classified as unskilled either in
nature. The system provides no accurate evaluation without
collaboration among analysts and it provides no adequate
basis of comparing dissimilar jobs.

The ranking system is a part of the work evaluation
system and differs from the latter in developed methods only
in that factors or components are disregarded and the job
is considered as a unit while no attempt is made to limit
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this study because of inability to gain collaboration from
team analysts and because of inadequate data for use in
development of a yardstick.

The Point System is shown for use here for the
purpose of comparison. The method provides a rating for each
element based on statistically developed against large

numbers of jobs. It provides measuring instruments that are accurate beyond anything that could be developed through use of our limited number of jobs. Also, the system is used because collaborators or judges of job difficulty could not be gotten together to collectively develop standards and pool their judgments.

Point Systems of job evaluations have probably had the widest application of any of the systems. They are now being used extensively by several major industrial concerns and are rapidly gaining widespread usage. In some instances they have been applied only to plant jobs, while in others the system originally applied to the plant jobs has been carried over to include the office positions.

Under the point system a number of factors, such as age, education, years of training needed, and physical effort involved, are predetermined as factors which probably will be found common to all jobs. A schedule of points to be assigned for the various gradations of each factor is then prepared. For example, one point may be assigned for required education of grammar school or less; two points for 1 or 2 years of high school; three points for 3 or 4 years of high school; four points for 2 years of college; and five points for college completion. In applying this point scale, any job adjudged to require a high-school graduate would receive a credit of three points for educational requirements. There are many variations of the point system, some using weightings and others combined with graphic rating scales.¹

This system provides descriptions of job factors and degree limitations for measuring jobs against the factors. It also provides scales for recording judgments of an analyst according to his opinion of the degree to which a factor is involved in the performance of a job, and conversion tables

¹Industrial Job Evaluation Systems (U. S. Dept. of Labor, Publication of the U. S. Employment Service, Occupational Analysis Branch [Washington, D. C.: Government Printing Office, Revised October 1947]), p. 7.

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This system provides descriptions of job factors and degree limitations for assessing jobs against the factors. It also provides scales for recording judgments of an analyst according to his opinion of the degree to which a factor is involved in the performance of a job, and conversion tables

for use in converting scale markings into numerical values.

For purposes of this comparison, the factor limitations and conversion tables as presented by Ray E. Hibbs in Job Valuation¹ are used with no modifications other than the elimination of three factors which would give little data of importance in comparison of job demands.

The full list of factors used in this study are:

SKILL

Experience

Education

Initiative and Ingenuity

EFFORT

Mental or Visual Demand

Physical Demand

RESPONSIBILITY

Spoilage of Materials

Work of Others

WORKING CONDITIONS

Hazards to Self

The numerical score table from the test prepared by Hibbs is used as it is presented with the total possible score being reduced by a simple subtraction of the allowable scores for the three factors which have been deleted. A simple subtraction of these items gives a relatively higher weighting for the remaining factors. The relative increase in comparative weight of factors is of no consequence since the increase would apply similarly to any job studied.

¹Ray E. Hibbs, Job Valuation by the Precision Method (Ray E. Hibbs and Associates, Minneapolis, Minn.: 1947).
The McGraw-Hill Publishing Company, 1947, p. 100.

more funds will be made available to bail him out

SECRET
Central Intelligence Agency
Washington, D.C.

YIELDING UP
WILLING TO SURRENDER
WILLING TO SURRENDER

File of Serial

The numerical scores have been prepared by adding the scores for the three factors which have been deleted. A relative correction of these items gives a relatively higher weight for the remaining factors. The relative increase in the weight of factors is as follows:

CHAPTER III

DEFINITIONS

Skill

There are words that come to be used so frequently and by being bandied about take on so many meanings, that even lexicographers offer little clarifying information. A word which has become so hackneyed is the word skill. Even when used by men of learning, the word assumes a character of unreliability. In most cases the word is freely used with apparent disregard of limited meaning. In works where the word is thoughtfully used, there is disagreement and confusion in its use. Funk & Wagnalls give this definition:

The familiar knowledge of any science, art, or handicraft, with practical efficiency.

The Oxford Dictionary defines "skill" as:

Expertness, practised ability, facility in doing something, dexterity, tact.

An industrial education text gives this statement:

Habits are developed by repeating experiences again and again. If we repeat pleasant experiences we make habits of them, and it is the best way to develop skill. Skills are habits.¹

This study is written around the demands which a job places upon a worker. This was done because requirements of a job can be listed and separately defined. Originally, the thought was to weigh degrees of skill required in the

¹Verne C. Fryklund, Trade and Job Analysis (Milwaukee: The Bruce Publishing Company, 1942), p. 123.

Skill

There are words that come to be used so frequently and by being handled about take on so many meanings, that even the most careful student of language is liable to be misled. A word which has become so hackneyed is the word skill. Even when used by men of learning, the word assumes a character of unreliability. In most cases the word is freely used with a broad and somewhat of limited meaning. In works where the word is thoughtfully used, there is disagreement and confusion in its use. Funk & Wagnell give this definition:

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The Brown Publishing Company, 1922, p. 123.
 James O. Brykman, Trails and Job Analysis (Milwaukee)

performance of jobs; however, this had to be abandoned because of unreliability of the word and immeasurability of the quality.

Skill, as it is used in job classification and wage evaluation, is subdivided into education, experience, initiative, ingenuity, manipulative ability, mentality, etc., etc. Skill and job requirements can be broken into minute components and each may be measured. For practical purposes the factors or components must be limited. The addition of many factors brings about much overlapping and a duplicate measurement of the same or correlated qualities. No satisfactory definition of skill has been found. In this study the skill factors used are those provided in published material. The factors, rather than the overall quality, are defined. A simple choice had to be made since no standardized measurements of skill are available.

In connection with the discussion of factors, it must be emphasized that no standard collection of compensable factors - and their accompanying definitions - exists today. As previously stated, each organization conducting an evaluation program chooses its own set of factors for consideration on the basis of its own needs and experience.¹

Semi-Skill

Jobs performed by the blind generally fall into every classification. The individuals in the group are a cross

¹Industrial Job Evaluation Systems (U. S. Dept. of Labor, U. S. Employment Service, Occupational Analysis Branch [Washington, D. C.: Government Printing Office, Revised October 1947]), p. 17. Dictionary of Occupational Titles, Part II, Group Arrangement of Occupational Titles and Index (Washington, D. C.: Government Printing Office, 1947), p. 118.

performance of the task; however, this had to be abandoned because of unreliability of the word and immutability of the quality.

Skill, as it is used in job classification and wage evaluation, is subdivided into education, experience, initiative, inventiveness, manipulative ability, mentality, etc., etc. Skill and job requirements can be broken into minute components and each may be measured. For practical purposes the factors or components must be limited. The addition of many factors brings about overlapping and a duplicate measurement of the same or correlated qualities. In the satisfactory definition of skill has been found. In this study the skill factors used are those provided in published material. The factors, rather than the overall quality, are defined. A simple choice had to be made since no standardized measurements of skill are available.

In connection with the discussion of factors, it must be emphasized that no standard collection of components is listed - and that is necessary. In the study of factors - which is the basis of the evaluation program - the own set of factors for consideration on the basis of its own needs and experience.

Skill-Skill

Jobs performed by the blind generally fall into every classification. The individuals in the group are a cross

section of the public and thus have abilities and interests wide enough to lead them into a very wide range of pursuits. Blind workers in special workshops for the blind hold positions ranging from janitor to executive.

When a search was made through U.S.E.S. material for analyses of jobs which might be found in special workshops, it was found that no analyses existed except a few which were all classified as "semi-skilled".

This group includes manual occupations that are characterized by one, or a combination of parts, of the following requirements: The exercise of manipulative ability of a high order, but limited to a fairly well defined work routine; major reliance, not so much upon the worker's judgment or dexterity, but upon vigilance and alertness, in situations in which lapses in performance would cause extensive damage to product or equipment; and the exercise of independent judgment to meet variables in the work situation, which is not based on wide knowledge of a work field and with the nature and extent of the judgments limited either (a) by application over a relatively narrow task situation or (b) by having important decisions made by others. These occupations may require the performance of part of a craft or skilled occupation, but usually to a relatively limited extent.¹

Job

This is another confusing word in connection with work performed. The word becomes loose in meaning because of its wide application in the language, so that it takes on variable meanings in the several applications.

A job is a group of similar positions in a single plant, business establishment, educational institution or other organization. There may be

¹U. S. Department of Labor, Dictionary of Occupational Titles, Part II, Group Arrangement of Occupational Titles and Codes (Washington, D. C.: Government Printing Office, 1939), p. 115

position of the public and there have been no changes in the position of the public and there have been no changes in the position of the public.

When a search was made through the files of the Bureau of Labor Statistics for the period 1914-1918, the following results were obtained:

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variable meanings in the several applications.

A job is a group of similar positions in a single plant, business establishment, educational institution or other organization. There may be

only one or there may be many persons employed in the same job.¹

Another example is the definition as given by Fryklund:

The work that one does and gets paid for is called his job. Regardless of what he does, whether it is custom work or repetitive work, whether he is a skilled mechanic or an operative, he has a job, a pay-roll job. The work that he does may require training. Job training means training for an occupation whether the work is simple or complex. The use of the term job in connection with what people get paid to do makes it essentially a production term.

Another meaning has been given to it. It is also referred to as a piece of work done or a completed project; both have about the same meaning. Whether there is reference to a building under construction, a pattern, a casting, a metal vise, a cabinet being made, or a repair assignment, any of them may be referred to as a job. That is according to this meaning, job and project are the same.²

The U.S.E.S. meaning for the word is accepted here.

The term "job" is used in many different ways and has different meanings according to the individuals using the term. To some it means a task, to others it means a group of like positions - a job....

A job may be defined as a group of positions which are identical with respect to their major or significant tasks. Therefore, a job may be considered as a group of positions which are sufficiently alike to justify their being covered by a single analysis.³

¹Carroll L. Shartle, Occupational Information (New York: Prentice-Hall, Inc. 1946), p. 11.

²Fryklund, op. cit., p. 37.

³Training and Reference Manual for Job Analysis, U. S. Employment Service, Department of Labor, Occupational Analysis and Industrial Services Division, (Washington, D.C.: Government Printing Office, 1944) p. 7.

only one or there may be many persons employed in the same job.

Another example is the definition as given by F. W. Loomis:

The work that one does and gets paid for is called his job. Regardless of what he does, whether it is casual work or repetitive work, whether he is a skilled mechanic or an operative, he has a job, a pay-roll job. The work that he does may require training. Job training means training for an occupation whether the work is simple or complex. The use of the term job in connection with what people are paid to do makes it essentially a production term.

Another meaning has been given to it. It is also referred to as a piece of work done or a completed project. People have about the same meaning. Another sense is reference to a definite order or assignment, a position, a calling, a need, time, a definite duty made, or a specific assignment, any of them may be referred to as a job. That is according to Loomis. Meaning, job and project are the same.

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Joseph L. Loomis, Occupational Information (New York: Prentice-Hall, Inc., 1944), p. 11.

Psychology, 2nd ed., p. 47.

Training and Selection Manual for Job Analysis, U. S. Department of Labor, Bureau of Labor Statistics, Bureau of Industrial Services Division, (Washington, D.C.: Government Printing Office, 1944) p. 7.

Job Analysis

This is a term which is in dispute among the several disciplines surrounding the study of jobs. Those who study work for the purpose of outlining training claim exclusive use of the term.

Unfortunately there have been careless uses of the term job analysis. There are many kinds of research activities in industry and business that are referred to as job analyses. Because they are thus identified, their users have attempted to employ them in determining training elements but usually without success. Brief descriptions at least of the more common analysis procedures, that have been confused with trade and job analysis for training purposes, are therefore necessary in connection with the study of trade and job analysis.¹

Workers in the field of job evaluation, for the purposes of job classification or rate setting, and for placement work, etc., assume a right to the use of the word "analysis".

Job Analysis is defined as the process of determining, by observation and study, and reporting pertinent information relating to the nature of a specific job. It is the determination of the tasks which comprise the job and of the skills, knowledges, abilities, and responsibilities required of the worker for successful performance and which differentiate the job from all others.

Basically, there are but three parts to the analysis of any job: (1) The job must be completely and accurately identified; (2) the tasks of the job must be completely and accurately described; (3) the requirements the job makes upon the worker for successful performance must be indicated.²

¹Fryklund, op. cit., p. 7.

²Training and Reference Manual for Job Analysis
U.S.E.S., op. cit., p. 1.

Job Analysis

This is a term which is in dispute among the several assignments surrounding the study of jobs. Those who always were for the purpose of establishing a clear exclusive use of the term.

Unfortunately there have been careless uses of the term job analysis. There are many kinds of research activities in industry and business that are referred to as job analyses. Because they are thus identified, their users have attempted to apply them in determining training elements but usually without success. First, descriptions at least of the more common analysis procedures, that have been confused with those and job analysis for training purposes, are therefore necessary in connection with the study of trade and job analysis.

There is in the field of job evaluation, for the purpose of job classification or rate setting, and for placement work, etc., a right to the use of the word "analysis".

Job Analysis is defined as the process of determining, by observation and study, and recording pertinent information relating to the nature of a specific job. It is the determination of the tasks which comprise the job and of the skills, knowledge, abilities, and responsibilities required of the worker for successful performance and which differentiate the job from all others.

Basically, there are two parts to the analysis of any job: (1) The job must be completely and accurately identified; (2) the tasks of the job must be completely and accurately described; (3) the requirements the job makes upon the worker for successful performance must be indicated.

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Job Evaluation

WHAT IS JOB EVALUATION? Job evaluation means exactly what it says. It means setting a value on each and every job in the organization. This may include office jobs as well as those in the plant or shop. It presupposes that some jobs are worth more than others because they require more than others. Some jobs require more skill from the worker; some require more experience; some more physical effort; and some more mental effort. Many jobs require considerable responsibility; others require but little. Boiled down to its simplest explanation, job evaluation means defining job requirements. If it is possible to define the requirements of the individual jobs in any given plant, it is possible to work out a plan of job evaluation.

In every case, emphasis is put on the job, not the worker. Job evaluation does not rate employees -- it does rate jobs. A good maxim to keep in mind is one that management engineers emphasize in every approach to job evaluation: RATE THE JOB -- NOT THE MAN.¹

Blind

This word is frequently used throughout this study. It does not necessarily refer to the condition of a total loss of vision. Individuals may be classified as blind when their visual impairment is such that it interferes with the normal functions involving sight. Until recently loose definitions of blindness have been in use. Best, in 1934, makes these statements:

For practical purposes, definitions of blindness which have been employed are: inability to see to read printed matter, even with the aid of glasses (if one has learned to read); to perceive

¹Job Evaluation Methods and Procedures, Report No. 605, Part One, compiled and released by The Dartnell Corporation, Chicago, Ill.

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the fact. The evaluation does not rate
employees -- it does rate jobs. A good example of
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concentrate in every situation for the evaluation
of the job -- not the man.

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For medical purposes, distilled water was used which has been subjected to distillation to remove all mineral matter, over which the following process has been carried out:

Mr. SOF, Fort One, Omaha and released by The District
Organization, Chicago, Ill.

large objects close at hand; to designate form or color; to count the fingers upon one hand within one foot (or perhaps within three feet) from the eye; to recognize the human face; to make out very large print without great difficulty; to engage in occupations requiring vision; or to be in possession of visual acuity of not less than one-tenth.¹

More exact definitions of blindness have come into use with the advent of governmental participation in work for the blind.

The term blindness does not mean only total absence of vision but includes all degrees of visual defect which are so severe as to prevent one from carrying on "the ordinary activities of life for which sight is essential." In ophthalmological terms, the definition drafted by the Committee on Statistics of the Blind, recommended by the Federal Social Security Board and adopted by most of the State agencies serving the blind, is as follows: Visual acuity of 20/200 or less in the better eye with correcting lenses; or visual acuity greater than 20/200 but with a limitation of the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees.²

¹Harry Best, Blindness and the Blind in the United States (New York: The MacMillan Company, 1934), p. 166.

²Robert B. Irwin, The Blind (a pamphlet published by the American Foundation for the Blind, Revised Edition January, 1947), p. 3

large objects close at hand; to distinguish form or color; to count the fingers upon one hand; within one foot (or perhaps within three feet) from the eye; to recognize the human face; to make out very large print without great difficulty; to engage in occupations requiring vision; or to be in possession of visual acuity of not less than one-tenth.

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Harry Ross, Blindness and the Blind in the United States (New York: The Macmillan Company, 1937), p. 193.

Robert H. Ives, The Blind (a pamphlet published by the American Foundation for the Blind, Revised Edition January, 1937), p. 3.

CHAPTER IV

COMPARISON OF PHYSICAL DEMANDS

Material available on Job Analyses furnished by the U.S.E.S. includes a "Physical Demands Form" checked to show the physical activities required of an individual who might successfully perform the particular job. These forms are furnished primarily for use in matching individuals having physical limitations, with job requirements. They are used by the Employment Service in their general work and by workers of the Office of Vocational Rehabilitation in their work of placing handicapped individuals in industrial jobs.

The Physical Demands Forms are not designed to minutely demonstrate job differences, rather they indicate the physical activities required of workers to perform a given job. A comparison of physical demands of jobs done by the blind, as a group, and the demands of jobs generally, does give some data to indicate differences. A copy of a typical "Physical Demands Form" is shown in Figure 1, Page 22. Definitions of the Physical Activities listed are as follows:

1. WALKING: Moving about on the feet by taking alternate steps, setting one foot before the other without running.
2. JUMPING: Projecting the body up, down, or horizontally through the air, primarily by the muscular action of the feet and legs.

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are as follows:

1. WALKING: Moving about on the feet by walking, alternating steps, walking on foot before the other without running.
2. STANDING: Positioning the body up, down, or horizontally through the air, primarily by the muscular action of the feet and legs.

FIGURE I

PHYSICAL DEMANDS FORM

Job Title _____ Occupational Code _____
Dictionary Title _____
Firm Name & Address _____
Industry _____ Industrial Code _____
Branch _____ Department _____
Company Officer _____ Analyst _____ Date _____

PHYSICAL ACTIVITIES	
1 Walking	16 Throwing
2 Jumping	17 Pushing
3 Running	18 Pulling
4 Balancing	19 Handling
5 Climbing	20 Fingering
6 Crawling	21 Feeling
7 Standing	22 Talking
8 Turning	23 Hearing
9 Stooping	24 Seeing
10 Crouching	25 Color Vision
11 Kneeling	26 Depth Perception
12 Sitting	27 Working Speed
13 Reaching	28
14 Lifting	29
15 Carrying	30

WORKING CONDITIONS	
51 Inside	66 Mechanical Hazards
52 Outside	67 Moving Objects
53 Hot	68 Cramped Quarters
54 Cold	69 High Places
55 Sudden Temp. Changes	70 Exposure to Burns
56 Humid	71 Electrical Hazards
57 Dry	72 Explosives
58 Wet	73 Radiant Energy
59 Dusty	74 Toxic Conditions
60 Dirty	75 Working With Others
61 Odors	76 Working Around Others
62 Noisy	77 Working Alone
63 Adequate Lighting	78
64 Adequate Ventilation	79
65 Vibration	80

DETAILS OF PHYSICAL ACTIVITIES:

3. **RUNNING:** Moving rapidly by using the feet and legs more quickly than in walking.
4. **BALANCING:** Walking, standing, or running on narrow or slippery elevated surfaces by maintaining body equilibrium to prevent falling.
5. **CLIMBING:** Ascending or descending ladders, stairs, scaffolding, ramps, poles, ropes and the like, using the feet and legs or using hands and arms as well.
6. **CRAWLING:** Moving about on the hands and knees or hands and feet.
7. **STANDING:** Supporting oneself on the feet and legs in an upright or nearly upright position.
8. **TURNING:** Twisting partly around from a stationary standing or sitting position, usually involving the spine, trunk, neck and legs.
9. **STOOPING:** Bending the body downward and forward by bending the spine at the waist; not crouching.
10. **CROUCHING:** Bending the body downward and forward by bending the legs and spine; not stooping.
11. **KNEELING:** Bending the legs at the knees to come to rest on the knee or knees.
12. **SITTING:** Resting upon the haunches or lower or posterior extremities of the trunk as in occupying a bench, chair, saddle, etc.
13. **REACHING:** Extending the hands and arms in any direction.
14. **LIFTING:** Raising or lowering an object from one level to another; includes upward pulling.
15. **CARRYING:** Transporting an object, usually by holding it in the hands and arms.
16. **THROWING:** Propelling an object through space by swinging motion of the hand and arm with or without the use of tongs or other devices.
17. **PUSHING:** Exerting force upon an object so that the object moves away from the force, including slapping, striking, kicking and treadle actions.

3. **RUNNING:** Moving rapidly by using the feet and legs more quickly than in walking.
4. **BALANCING:** Walking, standing, or working on a narrow or slippery elevated surface by maintaining body equilibrium to prevent falling.
5. **CLIMBING:** Ascending or descending ladders, stairs, scaffolding, ramps, poles, ropes and the like, using the feet and legs or using hands and arms as well.
6. **GRAVITY:** Moving about on the hands and knees on hands and feet.
7. **STANDING:** Supporting oneself on the feet and legs in an upright or nearly upright position.
8. **TRANSFERRING:** Relating partly around from a stationary standing or sitting position, usually involving the spine, trunk, neck and legs.
9. **STOOPING:** Bending the body downward and forward by bending the waist at the waist; not crouching.
10. **CROUCHING:** Bending the body downward and forward by bending the legs and spine; not stooping.
11. **KNEELING:** Bending the legs at the knees to come to rest on the knees or knees.
12. **SITTING:** Resting upon the buttocks or lower or posterior extremities of the trunk as in occupying a bench, chair, saddle, etc.
13. **REACHING:** Extending the hands and arms in any direction.
14. **LIFTING:** Raising or lowering an object from one level to another; includes upward pulling.
15. **CARRYING:** Transporting an object, usually by holding it in the hands and arms.
16. **THROWING:** Propelling an object through space by swinging motion of the hand and arm with or without the use of force or other device.
17. **PUSHING:** Exerting force upon an object so that the object moves away from the force, including shoving, striking, kicking and similar actions.

18. **PULLING:** Exerting force upon an object so that the object moves toward the force, including jerking.
19. **HANDLING:** Seizing, holding, grasping, turning, or otherwise working with the hand or hands; not fingering.
20. **FINGERING:** Picking, pinching, or otherwise working with the fingers primarily, (rather than with the whole hand or arm, as in Handling).
21. **FEELING:** Perceiving such attributes of objects as size, shape, temperature or texture, by means of receptors in the skin, typically those of the finger tips.
22. **TALKING:** Expressing or exchanging ideas by means of spoken word.
23. **HEARING:** Perceiving the nature of sounds by the ear.
24. **SEEING:** Perceiving the nature of objects by the eye.
25. **COLOR VISION:** Perceiving the color of objects by sight.
26. **DEPTH PERCEPTION:** Perceiving relative or absolute distances of an object from the observer or from one object to another.
27. **WORKING SPEED:** The rate of speed the job requires of the workers.¹

The jobs performed by the blind are listed on a collective chart in Figure II, Page 25. Each job is checked according to job demands found in the Job Analyses. The Chart shows the overall demands of jobs performed by the blind. The

¹Training and Reference Manual for Job Analysis, U. S. Employment Service, Department of Labor, Occupational Analysis and Industrial Services Division (Washington, D. C.: Government Printing Office, 1944), p. 41-43.

17. Tactile: Perceiving the shape of an object as it is touched. This is the most common sense for the blind, in-
cluding feeling.
18. Auditory: Hearing, feeling, smelling, tasting, or otherwise working with the hand as hands; not feeling.
19. Tactile: Feeling, feeling, feeling, or otherwise working with the fingers. This is the most common sense for the blind, in-
cluding feeling.
20. Tactile: Perceiving each attribute of objects as size, shape, temperature or texture, by means of receptors in the skin, typically those of the finger tips.
21. Tactile: Perceiving or exchanging ideas by means of spoken words.
22. Tactile: Perceiving the nature of sounds by the ear.
23. Tactile: Perceiving the nature of objects by the eye.
24. Tactile: Perceiving the color of objects by sight.
25. Tactile: Perceiving relative or absolute distance of an object from the observer by the eye and object in motion.
26. Tactile: The rate at which the job requires of the worker.

The jobs performed by the blind are listed on a collective chart in figure 11, page 25. Each job is checked according to job demands found in the job analysis. The chart shows the overall demands of jobs performed by the blind. The

FIGURE II

CHECK LIST SHOWING PHYSICAL ACTIVITIES
REQUIRED ON JOBS PERFORMED BY THE BLIND

[illegible]

jobs listed are frequently done by blind workers, yet if observation is made in a plant where only seeing workers are used, the false impression might be gained that sight is required. The false idea might arise in connection with mechanical hazards, in connection with mobility about the plant or about incidental facets of the work layout rather than in the real demands of the job itself.

Demands of jobs performed by workers in general industry are similarly shown in Figure III, Page 27. The collective requirements of these jobs can be compared to those in Figure II. When these two charts are rearranged in order of descending number of required physical activities, the two lists take the form shown in Figure IV, Page 28. It becomes apparent that there is a wide difference between physical activities in connection with work performed by the blind and work performed in general industry. The major activities in the list pertaining to the blind include virtually all of the activities shown on the list for general industry. However, those involving more strenuous activity, in every case, appear lower on the list of jobs relating to the blind.

An interesting facet is shown by the number indicating that one job in the group performed by the blind is checked to show the requirement of "Seeing", while it is well known that this job - Chair Reseating - is a common task performed by the blind. The job of Mop Sewer, according to

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observation is made in a plant where only seeing workers
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An interesting fact is shown by the number indicating
that one job in the group performed by the blind is checked
to show the requirement of "seeing", while it is well known
that this job - Drafting - is a common task per-
formed by the blind. The job of map maker, according to

FIGURE III

Walking
Jumping
Running
Balancing
Climbing
Crawling
Standing
Turning
Stooping
Crouching
Kneeling
Sitting
Reaching
Lifting
Carrying
Throwing
Pushing
Pulling
Handling
Fingering
Feeling
Talking
Hearing
Seeing
Color Vision
Depth Perception
Working Speed

FIGURE IV

PHYSICAL ACTIVITIES ARRANGED IN DESCENDING ORDER

	<u>Blind</u>		<u>General Industry</u>
Sitting	20	Standing	31
Standing	18	Lifting	18
Fingering	14	Walking	14
Lifting	12	Pulling	13
Reaching	11	Reaching	9
Pulling	11	Stooping	8
Handling	11	Pushing	8
Turning	10	Seeing	8
Feeling	9	Climbing	2
Walking	8	Carrying	2
Stooping	8	Turning	1
Carrying	6	Throwing	1
Pushing	3	Color Vision	1
Crouching	2	Jumping	0
Hearing	2	Running	0
Depth Perception	2	Balancing	0
Working Speed	2	Crawling	0
Balancing	1	Crouching	0
Talking	1	Kneeling	0
Seeing	1	Sitting	0
Jumping	0	Handling	0
Running	0	Fingering	0
Climbing	0	Feeling	0
Crawling	0	Talking	0
Kneeling	0	Hearing	0
Throwing	0	Depth Perception	0
Color Vision	0	Working Speed	0

Formed by the blind and have been made in comparison for the blind as to how other tasks, which they expect their blindness as a reflection of degree placed upon the blind workers. From a survey conducted of the data on the typical general task it seems apparent that not all of the demands of jobs are shared by all groups. For example, the job of Police III (folding garments), listed among those performed in general industry, does not share "handling" or "crouching".

PHYSICAL ACTIVITY IN COMMUNITY

Activity	Frequency	Intensity
Walking	10	10
Standing	10	10
Sitting	10	10
Lying	10	10
Swimming	10	10
Running	10	10
Cycling	10	10
Rowing	10	10
Weightlifting	10	10
Cardio	10	10
Strength Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
Martial Arts	10	10
Dance	10	10
Rock Climbing	10	10
Scuba Diving	10	10
Paragliding	10	10
Hot Air Ballooning	10	10
Zip Lining	10	10
Canyoning	10	10
Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
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Dance	10	10
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Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
Martial Arts	10	10
Dance	10	10
Rock Climbing	10	10
Scuba Diving	10	10
Paragliding	10	10
Hot Air Ballooning	10	10
Zip Lining	10	10
Canyoning	10	10
Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
Martial Arts	10	10
Dance	10	10
Rock Climbing	10	10
Scuba Diving	10	10
Paragliding	10	10
Hot Air Ballooning	10	10
Zip Lining	10	10
Canyoning	10	10
Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
Martial Arts	10	10
Dance	10	10
Rock Climbing	10	10
Scuba Diving	10	10
Paragliding	10	10
Hot Air Ballooning	10	10
Zip Lining	10	10
Canyoning	10	10
Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
Martial Arts	10	10
Dance	10	10
Rock Climbing	10	10
Scuba Diving	10	10
Paragliding	10	10
Hot Air Ballooning	10	10
Zip Lining	10	10
Canyoning	10	10
Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing	10	10
Martial Arts	10	10
Dance	10	10
Rock Climbing	10	10
Scuba Diving	10	10
Paragliding	10	10
Hot Air Ballooning	10	10
Zip Lining	10	10
Canyoning	10	10
Ice Climbing	10	10
Rock Climbing	10	10
Mountain Biking	10	10
Trail Running	10	10
Endurance Training	10	10
Speed Training	10	10
Agility Training	10	10
Balance Training	10	10
Coordination Training	10	10
Reaction Time Training	10	10
Stamina Training	10	10
Endurance Training	10	10
Strength Training	10	10
Cardio Training	10	10
Interval Training	10	10
Yoga	10	10
Pilates	10	10
Boxing		

the physical activities, requires sixteen activities. Nine of the jobs performed by the blind show physical activities in excess of eight, which is the maximum in connection with the random selection in general industry. Standing, lifting, walking and pulling are the most frequently used activities on the random selection. Sitting, standing, fingering, lifting and reaching are the most frequent activities in the blind group. Unfortunately, the degree to which these are required is not indicated. It appears that jobs performed by the blind require less in expenditure of physical effort. The arithmetic mean of physical activities required on jobs performed by the blind is 4.5 as compared to 3.7 in connection with the random selection in industry. This shows that a wider variety of physical activities are required on jobs performed by the blind.

Each U.S.E.S. analysis is made by a single individual which reduces accuracy. The analyses concerning jobs performed by the blind may have been made in workshops for the blind or in any other plant, which may affect their accuracy as a reflection of demands placed upon the blind workers.

From a cursory examination of the data on the Physical Demands Form it seems apparent that not all of the demands requiring heavy expenditure of energy are totaled, as of jobs were checked by analysts. As examples, the job of Folder III (folding garments), listed among those performed blind and in particular as jobs performed in general in general industry, does not show "handling" or "fingering".

the physical activities, repetitive motion activities, nine of the jobs performed by the blind show physical activities in excess of eight, which is the maximum in connection with the random selection in general industry. Lifting, lifting, walking and pushing are the most frequently used activities on the random selection. Lifting, standing, fingerling, lifting and reaching are the most frequent activities in the blind group. Unfortunately, the types of jobs which are reported as not indicated. It appears that jobs performed by the blind require less in expenditure of physical effort. The arithmetic mean of physical activities reported on jobs performed by the blind is 4.8 as compared to 5.7 in connection with the random selection in industry. This shows that a wider variety of physical activities are reported on jobs performed by the blind.

Each U.S.E.S. analysis is made by a single individual which reduces accuracy. The analysis concerning jobs performed by the blind may have been made in workhouses for the blind or in any other plant, which may affect their accuracy as a reflection of demands placed upon the blind workers.

From a summary examination of the data on the physical demands form it seems apparent that not all of the demands of jobs were checked by analysts. As examples, the job of folder III (folding garments), listed among those performed in general industry, does not show "handling" or "fingerling".

The job of Basket Maker (Square) listed among those jobs performed by the blind does not indicate that "fingering", "feeling", "walking" or "carrying" are required activities although materials must be woven by hand and materials in bundles must be carried from a storage room. This apparent incompleteness of data on analysis forms can seriously limit the accuracy of any comparison of physical demands taken from this material.

The physical activities listed can be divided into two groups, those requiring heavy expenditures of energy and those requiring small expenditures of energy. The two lists appear as follows:

Heavy Expenditure
of Energy

Walking
Jumping
Running
Balancing
Climbing
Crawling
Stooping
Crouching
Kneeling
Lifting
Carrying
Throwing
Pushing
Pulling
Working Speed

Small Expenditure
of Energy

Standing
Turning
Sitting
Reaching
Handling
Fingering
Feeling
Talking
Hearing
Seeing
Color Vision
Depth Perception

When the number of checks appearing beside activities requiring heavy expenditures of energy are totaled, we find 53 such checks applying to jobs performed by the blind and 66 pertaining to jobs performed in general

industry. We find 99 checks pertaining to small expenditure of energy for the blind and 49 applying to jobs in general industry. Thirty-five percent of the checks pertaining to jobs done by the blind indicate activities requiring heavy expenditures of energy as compared with 57% in general industry. From this we would deduce that jobs performed in general industry require heavier expenditures of energy.

judgment as to the conditions which they find most tiring a job. In a consideration of the over-all findings presented upon a survey by a job, the conditions requiring the most effort to perform were noted. The working conditions listed as being particularly important by workers attending at the analysis are listed in the Training and Information Bureau of the U.S.D.E. as follows:

1. Indoor protection from weather conditions.

2. Protection from wind, or other weather conditions, and from light protection from the weather.

3. Temperature sufficiently high to cause perspiration; humidity discomfort.

4. Temperature sufficiently low to cause perspiration; humidity discomfort.

5. Rapid temperature changes; variations in temperature; and other conditions which are difficult to adjust to cause perspiration; humidity discomfort.

6. Humidity sufficiently high to cause perspiration; humidity discomfort.

7. Humidity sufficiently low to cause perspiration; humidity discomfort.

industry. To find it easier pertaining to small amounts of energy for the blind and 40 percent to jobs in general industry. Fifty-five percent of the work performed in jobs done by the blind indicate activities requiring heavy expenditures of energy as compared with 67% in general industry. From this we would estimate that loss suffered in general industry would be heavier expenditure of energy.

General Industry		Blind Industry	
1. Manufacturing	67%	1. Manufacturing	55%
2. Transportation	67%	2. Transportation	55%
3. Commerce	67%	3. Commerce	55%
4. Services	67%	4. Services	55%
5. Agriculture	67%	5. Agriculture	55%
6. Fishing	67%	6. Fishing	55%
7. Mining	67%	7. Mining	55%
8. Construction	67%	8. Construction	55%
9. Education	67%	9. Education	55%
10. Health	67%	10. Health	55%
11. Recreation	67%	11. Recreation	55%
12. Other	67%	12. Other	55%

CHAPTER V

COMPARISON OF WORKING CONDITIONS

The U.S.E.S. "Physical Demands Form", as shown in Figure I, Page 22, in addition to a listing of physical activities, gives a check list of "Working Conditions". These conditions are judged by analysts as to whether or not they prevail in connection with individual jobs. Analysts observe jobs and indicate on these forms their judgment as to the conditions which they find surrounding a job. In a consideration of the over-all demands placed upon a worker by a job, the conditions surrounding his work must be taken into account. The working conditions listed as being sufficiently important to receive attention of the analysts are defined in the Training and Reference Manual of the U.S.E.S. as follows:

Inside: Indoor protection from weather conditions.

Outside: Out of doors, or under an overhead covering with slight protection from the weather.

Hot: Temperature sufficiently high to cause perceptible bodily discomfort.

Cold: Temperature sufficiently low to cause perceptible bodily discomfort.

Sudden Temperature Changes: Variations in temperature which are sufficiently marked and abrupt to cause perceptible bodily reactions.

Humid: Atmospheric condition with moisture content sufficiently high to cause perceptible bodily discomfort.

Dry: Atmospheric condition with moisture content sufficiently low to cause perceptible bodily discomfort.

CHAPTER 7

DETERMINATION OF WORKING CONDITIONS

The U.S.S.R. "Hygienic Standards" as shown in

Figure 1, page 53, in addition to a listing of physical

conditions, shows a check list of "Working Conditions".

These conditions are judged by analysts as to whether or

not they prevail in connection with individual jobs.

Analysts observe jobs and indicate on these forms their

judgment as to the conditions which they find surrounding

a job. In a consideration of the over-all demands placed

upon a worker by a job, the conditions surrounding his work

must be taken into account. The working conditions listed

as being sufficiently important to require attention of

the analysts are defined in the Training and Reference

Manual of the U.S.S.R. as follows:

Light: Lesser protection from weather conditions.

Temperature: Not at home, or under an overhead cover-
ing with slight protection from the weather.

High: Temperature sufficiently high to cause per-
ceptible bodily discomfort.

Low: Temperature sufficiently low to cause per-
ceptible bodily discomfort.

Relative Humidity: Variations in temperature
which are sufficiently marked and abrupt to cause
perceptible bodily discomfort.

Wind: Atmospheric conditions which are sufficient to cause
perceptible bodily discomfort.

Atmospheric conditions: Atmospheric conditions which are
sufficiently low to cause perceptible bodily
discomfort.

Wet: Contact with water or other liquids.

Dusty: Air filled with small particles of any kind such as textile dust, flour, wood, leather, feathers, etc., and inorganic dust including silica and asbestos, which make the workplace unpleasant or are the source of occupational diseases.

Dirty: Contact with or exposure to dirt, litter, soiled materials, etc.

Odors: Perceptible smells, either toxic or nontoxic.

Noisy: Sufficient sound to cause thought distraction or possible injury to the sense of hearing.

Adequate Lighting: Sufficient lighting to minimize eye strain. (A zero before this item would indicate the lighting is either insufficient or excessive).

Adequate Ventilation: Sufficient ventilation to cause neither a feeling of suffocation nor exposure to drafts. (A zero before this item would indicate that the ventilation is insufficient or excessive).

Vibration: Production of an oscillating or quivering movement of the body or strain on the muscles, particularly of the legs and arms, as from repeated motion, pressure, or shock.

Mechanical Hazards: Exposure to materials or mechanical parts involving the risk of bodily injury.

Moving Objects: Exposure to moving equipment and objects such as overhead cranes, hand and motor driven vehicles, falling objects, etc., which involve the risk of bodily injury; also the act of operating such equipment.

Cramped Quarters: Workplace where freedom of movement is restricted or where worker cannot maintain an upright position.

High Places: Workplace at an elevation above the floor or ground level from which it is possible to fall and be injured.

Exposure to Burns: Workplace involving the risk of being burned from hot materials, fire or chemical agents.

2. Contact with water or other liquids.

2.1. Air filled with small particles of any kind such as dust, dirt, flour, wood, paper, etc., and liquids such as oil, etc., which make the workplace unpleasant or are the cause of occupational diseases.

2.2. Contact with or exposure to dirt, litter, solid materials, etc.

2.3. Contact with or exposure to noise or vibration.

2.4. Contact with or exposure to heat or cold or radiation.

2.5. Contact with or exposure to light or electromagnetic fields.

2.6. Contact with or exposure to mechanical hazards.

2.7. Contact with or exposure to biological hazards.

2.8. Contact with or exposure to chemical hazards.

2.9. Contact with or exposure to physical hazards.

2.10. Contact with or exposure to other hazards.

2.11. Contact with or exposure to other hazards.

2.12. Contact with or exposure to other hazards.

Electrical Hazards: Exposure to high-tension wires, transformers, bus-bars, or other uninsulated or unshielded electrical equipment which involve the risk of electric shock.

Explosives: Exposure to explosive gases, vapors, dusts, liquids, and substances which involve the risk of bodily injury.

Radiant Energy: Exposure to radio-active substances (radium, uranium, thorium, etc.), X-Rays, ultra-violet rays, or infra-red rays, which involve the risk of impairment of sight or general or localized disabling conditions.

Toxic Conditions: Exposure to toxic dusts, fumes, gases, vapors, mists, or liquids which cause general or localized disabling conditions as a result of inhalation or action on the skin.

Working With Others: Job requires occupational cooperation with fellow workers, or direct contact with the public.

Working Around Others: Job requires independent occupational effort but in proximity to fellow workers or the public.

Working Alone: Job requires independent occupational effort and virtually no contact with fellow workers or the public.

The U.S.E.S. Analyses are made by analysts who study a job in the place where it is performed and record their judgment concerning the working conditions. Regardless of the caliber of analysts, single judgments increase human error. Inaccuracies appear to exist in connection with the completion of the Working Conditions Form. An example of this appears in the checking for the job of Broom Sewer. Neither "Noisy" nor "Mechanical Hazards" are checked, while

¹ Training and Reference Manual for Job Analysis, U.S. Employment Service, Department of Labor, Occupational Analysis and Industrial Services Division, (Washington, D.C.: Government Printing Office, 1944) pp. 43-44.

Electrical Hazards: Exposure to high-voltage wires, transformers, hot-bars, or other uninsulated or grounded electrical equipment which involve the risk of electric shock.

Explosives: Exposure to explosive gases, vapors, dusts, liquids, and substances which involve the risk of bodily injury.

Ionizing Radiation: Exposure to radio-active substances (alpha, beta, gamma, x-rays, etc.), which involve the risk of impairment of sight or general or localized disabling conditions.

Toxic Substances: Exposure to toxic gases, fumes, vapors, mists, or liquids which cause general or localized disabling conditions as a result of inhalation or action on the skin.

Working with Heavy Tools: Job requires occasional use of tools, or direct contact with the public.

Working Around Others: Job requires independent occupational effort but is proximately to fellow workers or the public.

Working Alone: Job requires independent occupational effort and virtually no contact with fellow workers or the public.

The U.S.S. analysis was made by analysts who study a job in the place where it is performed and record their judgment concerning the working conditions. Regardless of the caliber of analysts, single judgments increase in error. Improvements appear to exist in connection with the completion of the Working Conditions form. An example of this appears in the following for the job of Room Heater. Referred to as "Refrigerator Repairman" and changed, this

Working Conditions form for the job of Room Heater, U.S.S. Department of Labor, Occupational Analysis and Industrial Hygiene Division, Washington, D.C. 20540-0001, 1964, pp. 42-44.

limitation to accuracy.

performed under

both are represented on this graph for the 10-
 economic limit the value of this condition and the limit
 of limitation of the force to which the listed conditions
 exist in a further limitation is necessary.

Whether or not the mass of jobs performed by listed
 workers are performed under similar or dissimilar conditions
 in these cases the indicated by the mass of workers in
 jobs in general industry and in all importance in comparing
 job demands. An attempt is made in specific collective data
 on jobs done by the listed and on jobs selected by random
 from general industry to make comparisons and find similar-
 ities or differences.

The groups of jobs performed by the listed are shown on
 the next figure 7, page 36, along with recorded judgments
 against working conditions as they are taken directly from
 completed U.S.S.R. analyses. The chart shows the working
 conditions surrounding individual jobs - that, on over-all
 picture of working conditions, which are generally ex-
 perimented by listed workers, emerges.

Figure VI, page 35, shows a composite of judgments of
 working conditions of jobs selected from general industry.
 This chart, too, shows recorded judgments as they are taken
 from completed U.S.S.R. analyses. The findings of a single
 analysis are reflected by the number corresponding to each
 job and pertaining to each listed condition of work. This
 chart shows a picture of conditions of work as they are

FIGURE VI
CHECK LIST SHOWING WORKING CONDITIONS
ON JOBS PERFORMED IN GENERAL INDUSTRY

Inside Outside	Hot	Cold	Sudden Temp.	Changes	Humid	Dry	Wet	Dusty	Dirty	Odors	Noisy	Adequate Lighting	Adequate Ventilation	Vibration	Mechanical Hazards	Moving Objects	Cramped Quarters	High Places	Exposure to Burns	Electrical Hazards	Explosives	Radiant Energy	Toxic Conditions	Working With Others	Working Around Others	Working Alone
Flour Sifter I #601726	x					x		x				x											x			
Doughnut Mach. Oper. #501187	x	x						x																		
Blanching Mach. Oper. #103958	x	x			x		x					x														
Candy Coater (Chewing Gum) #600955	x							x															x			
Ham Cutter #603397	x														x								x			
Water Mangle Operator #Va-205					x																		x	x		
Feeling Mach. Oper. #204868	x											x												x		
Fur Cutter #203373	x									x					x											
Ironer (Crown) #203322	x											x														
Inspector (Felt Hat) #102992	x																									
Folder III #901153	x																									
Belt Sander Oper. #900685	x																									
Operator Chucking Mach. #700899	x																									
Cushion Builder #A-88	x																							x		
Edge Wire Former #1200672	x																									
Slack Barrel Inspector #600489	x																									
Pole Machine Helper #900495	x																									
Resin Bin Loader #1202677	x																									
Bone Drier Operator #1201739	x																									
Tube Machine Operator III #205143	x																									
Colorer (Finishing) #603406	x																									
Embosses #204481	x																									
Heel Scorer #302789	x																									
Butter III #504510	x																									
Silverer #606597	x																									
Turret Lathe Operator #1203176	x																									
Machine Molder Strip. Plate #400831	x																									
Drop Hammer Operator #700722	x																									
Power Shear Operator #205223	x																									
Helical Spring Mach. Oper. #505914	x																									
Stock Clerk (Baker) #301953	x																									
Total	30	1	9	0	1	0	2	2	10	6	3	15	10	9	0	0	0	1	2	0	0	0	0	5	0	0

experienced by workers in industry generally.

Most of the working conditions considered by the analyst indicate undesirable, hazardous, or efficiency reducing features of a worker's environment. This is not necessarily true in connection with the following:

Inside
Outside
Adequate Lighting
Adequate Ventilation
Working With Others
Working Around Others
Working Alone

Two rearrangements of listed working conditions are shown in Figures VII, Page 39 and VIII, Page 40. Each is arranged in order of descending importance. The importance is judged by the abundance of checks relating to each condition of work. Figure VII shows a chart of working conditions arranged in a descending order of importance including conditions of work which may not indicate unpleasant or hazardous surroundings. Figure VIII lists, in descending order, the hazardous, efficiency reducing and unpleasant conditions.

The total number of checks appearing in connection with jobs done by the blind is 110. Those accompanying jobs in general industry total 117. The average number of checks indicating hazardous, unpleasant, or efficiency reducing conditions in jobs done by the blind is 1.2. A corresponding number in connection with jobs from general industry is 2.0. This, to a small degree, might indicate

experienced by workers in industry generally.
Most of the working conditions considered by the
analyst indicate undesirable, hazardous, or efficiency
reducing features of a worker's environment. This is not
necessarily true in connection with the following:

Working Alone
Working Around Others
Working with Others
Isolation
Adverse Lighting
Unstable
Fixed

Two rearrangements of listed working conditions are shown
in Figures VII, Page 38 and VIII, Page 40. Each is
arranged in order of descending importance. The importance
is judged by the abundance of checks relating to each condi-
tion of work. Figure VII shows a chart of working conditions
arranged in a descending order of importance including
conditions of work which may not indicate unpleasant or
hazardous surroundings. Figure VIII lists, in descending
order, the hazardous, efficiency reducing and unpleasant
conditions.

The total number of checks appearing in connection
with jobs done by the blind is 110. Those accompanying
jobs in general industry total 117. The average number of
checks indicating hazardous, unpleasant, or efficiency
reducing conditions in jobs done by the blind is 1.8. A
corresponding number in connection with jobs from general
industry is 2.3. This, in a small degree, might indicate

FIGURE VII

WORKING CONDITIONS IN DESCENDING ORDER
OF IMPORTANCE WHICH DO NOT INDICATE UN-
PLEASANT, HAZARDOUS OR EFFICIENCY-
REDUCING SURROUNDINGS

<u>Jobs Performed by the Blind</u>		<u>Jobs Performed in General Industry</u>	
Inside	34	Inside	30
Adequate Ventilation	17	Adequate Lighting	10
Adequate Lighting	13	Adequate Ventilation	9
Working Around Others	5	Working With Others	5
Working Alone	1	Outside	1
Outside	0	Working Around Others	0
Working With Others	0	Working Alone	0
	<hr/>		<hr/>
Total Conditions	70	Total Conditions	55

STATIONING INFORMATION IN REVERSE ORDER
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[illegible][illegible]

FIGURE VIII

WORKING CONDITIONS IN DESCENDING ORDER OF
IMPORTANCE WHICH MAY INDICATE UNPLEASANT,
HAZARDOUS OR EFFICIENCY-REDUCING SURROUNDINGS

all percent of the checks involved in jobs done by the
blind would indicate efficiency reducing conditions, while
23% of the checks pertaining to jobs in general industry
Jobs Performed
by the Blind
Jobs Performed
in General Industry

Noisy	11	Noisy	15
Dusty	10	Dusty	10
Humid	5	Hot	9
Dirty	4	Dirty	6
Hot	3	Mechanical Hazards	6
Mechanical Hazards	3	Humid	3
Vibration	2	Odors	3
Dry	1	Dry	2
Odors	1	Wet	2
Cold	0	Exposure to Burns	2
Sudden Temp. Changes	0	Toxic Conditions	2
Wet	0	Sudden Temp. Changes	1
Moving Objects	0	High Places	1
Cramped Quarters	0	Cold	0
High Places	0	Vibration	0
Exposure to Burns	0	Moving Objects	0
Electrical Hazards	0	Cramped Quarters	0
Explosives	0	Electrical Hazards	0
Radiant Energy	0	Explosives	0
Toxic Conditions	0	Radiant Energy	0
	40		62

that blind workers are subjected to a lesser variety of conditions involving efficiency reducing features. Thirty-six percent of the checks involved in jobs done by the blind would indicate efficiency reducing conditions, while 53% of the checks pertaining to jobs in general industry indicate such conditions.

The study shows that some differences do exist which would indicate that a greater variety of unpleasant, hazardous or efficiency reducing conditions are found in connection with jobs selected from general industry. The apparent unreliability of the checking raises question about the importance of the indication while the fact that two jobs, Broom Sewer and Mop Sewer, from the list of jobs performed by the blind, involve these conditions to a greater extent than any job performed in general industry, with the exception of Machine Molder-Stripping Plate.

1 - An above-average degree of the characteristic is required, either in several elements of the job or in the major or most skilled element.

2 - A very high degree of the characteristic is required in some element of the job.

The analyst studies the job and makes judgments as to the proper degree to which a characteristic is required and checks his chart accordingly. In his work of making judgments, he is guided by three assumptions of the 1933A Characteristics.

that blind workers are subjected to a lesser variety of conditions involving efficiency reducing features. Thirty-

six percent of the cases involved in jobs done by the blind would indicate efficiency reducing conditions, while 83% of the cases pertaining to jobs in general industry

indicate such conditions.

The study shows that some differences do exist which would indicate that a greater degree of unpleasant, noisy, and efficiency reducing conditions are found in connection with jobs selected from general industry. The apparent im-

possibility of the existing raise question about the importance of the indication while the fact that two jobs, known better and less known, from the list of jobs reviewed by the blind, involve these conditions to a greater extent than are job performed in general industry, with the exception of certain jobs-industry listed.

CHAPTER VI

COMPARISON OF WORKER CHARACTERISTICS

Included in each U.S.E.S. Job Analysis is a checked chart listing characteristics required of workers for a particular job. The Worker Characteristics Form lists 47 characteristics which might be required of a worker in order that he could successfully perform the particular job. Space is provided for an analyst to check on a 4-point scale the degree to which a single characteristic is required. A typical Worker Characteristics Form is shown in Figure IX, Page 43. The degrees indicated by the letters

O, C, B, and A, which the analyst places on the chart are limited according to these definitions:

O - The characteristic is not required for satisfactory performance of the job.

C - A medium to very low degree of the characteristic is required in some elements of the job.

B - An above-average degree of the characteristic is required, either in numerous elements of the job or in the major or most skilled element.

A - A very high degree of the characteristic is required in some element of the job.

The analyst studies the job and makes judgments as to the proper degree to which a characteristic is required and checks his chart accordingly. In his work of making judgments, he is guided by these descriptions of the listed characteristics:

CHARACTERISTICS OF WORKER CHARACTERISTICS

Included in each U.S.E. Job Analysis is a check-
 sheet listing characteristics required of workers for a
 particular job. The Worker Characteristics form lists
 17 characteristics which might be required of a worker in
 order that he could successfully perform the particular job.
 Space is provided for an analyst to check on a 4-point
 scale the degree to which a characteristic is
 required. A typical Worker Characteristics form is shown
 in Figure IX, page 42. The degrees indicated by the letters
 O, 1, 2, and 3, which the analyst places on the chart are
 limited according to these definitions:

- 0 - The characteristic is not required for
 satisfactory performance of the job.
- 1 - A medium to very low degree of the
 characteristic is required in some elements
 of the job.
- 2 - An above-average degree of the characteristic
 is required, either in numerous elements of
 the job or in the major or most skilled element.
- 3 - A very high degree of the characteristic is
 required in some element of the job.

The analyst studies the job and makes judgments as to
 the proper degree to which a characteristic is required and
 checks his chart accordingly. In his work of making judg-
 ments, he is guided by these descriptions of the listed
 characteristics:

FIGURE IX

Form ES-267
(Rev. 2-44)

WAR MANPOWER COMMISSION
BUREAU OF MANPOWER UTILIZATION

Budget Bureau No. 11 RO-83.2
Approval Expires Feb. 28, 1946

WORKER CHARACTERISTICS FORM

Job Title _____ Schedule No. _____

Indicate the amount of each characteristic required of the worker in order to do the job satisfactorily by putting an X in the appropriate column. Following are the definitions of each level:

- O - The characteristic is not required for satisfactory performance of the job.
- C - A medium to very low degree of the characteristic is required in some element or elements of the job.
- B - An above-average degree of the characteristic is required, either in numerous elements of the job or in the major or most skilled element.
- A - A very high degree of the characteristic is required in some element of the job.

When in doubt between A and B, rate B; when in doubt between B and C, rate B; when in doubt between C and O, rate C. If some characteristic not on this list is required, write it in, rate it, and define it briefly at the bottom of the form.

AMOUNT					CHARACTERISTICS REQUIRED	AMOUNT					CHARACTERISTICS REQUIRED
O	C	B	A	O		C	B	A			
					1. Work rapidly for long periods.						26. Arithmetic computation.
					2. strength of hands.						27. Intelligence.
					3. strength of arms.						28. Adaptability.
					4. strength of back.						29. Ability to make decisions.
					5. strength of legs.						30. Ability to plan.
					6. Dexterity of fingers.						31. Initiative.
					7. Dexterity of hands and arms.						32. Understanding mechanical devices.
					8. Dexterity of foot and leg.						33. Attention to many items.
					9. Eye-hand coordination.						34. Oral expression.
					10. Foot-hand-eye coordination.						35. Skill in written expression.
					11. Coordination of both hands.						36. Tact in dealing with people.
					12. Estimate size of objects.						37. Memory of names and persons.
					13. Estimate quantity of objects.						38. Personal appearance.
					14. Perceive form of objects.						39. Concentration amidst distractions.
					15. Estimate speed of moving objects.						40. Emotional stability.
					16. Keeness of vision.						41. Work under hazardous conditions.
					17. Keeness of hearing.						42. Estimate quality of objects.
					18. Sense of smell.						43. Unpleasant physical conditions.
					19. Sense of taste.						44. Color discrimination.
					20. Touch discrimination.						45. Ability to meet and deal with public.
					21. Muscular discrimination.						46. Height.
					22. Memory for details (things).						47. Weight.
					23. Memory for ideas (abstracts).						48. _____
					24. Memory for oral directions.						49. _____
					25. Memory for written directions.						50. _____

DEFINITIONS FOR ADDITIONAL CHARACTERISTICS:

Work Rapidly for Long Periods: Ability to work at high speed during the entire working period. It does not involve consideration of energy output, but simply rate of performance.

Strength of Hands: Ability to perform work requiring strong muscles in fingers, hands, wrists, and fore-arms such as are primarily involved in squeezing, bending, pulling, twisting, snapping, turning, or gripping objects. It does not involve use of arm from elbow to shoulder as a primary muscular activity.

Strength of Arms: Ability to perform work requiring strong muscles in the arms from elbow to shoulder, such as are primarily involved in lifting, swinging, pushing, pulling, carrying or throwing objects.

Strength of Back: Ability to perform work requiring strong muscles in the back and shoulders such as are primarily involved in such activities as lifting objects from the floor, pushing with back and shoulders, or striking blows with sledge hammer.

Strength of Legs: Ability to perform work requiring strong, well-developed muscles in legs and thighs, ankles, and feet, such as are primarily required in such activities as lifting objects by knee action, operating pedals requiring pressure, gripping or bracing with the knees and legs, or extensive climbing, walking, kneeling, standing or crawling.

Dexterity of Fingers: Ability to move the fingers, or manipulate objects with the fingers, rapidly or accurately. This is not to be confused with the use of the fingers as part of whole-hand movement.

Dexterity of Hands and Arms: Ability to move hands and arms quickly or accurately.

Dexterity of Feet and Legs: Ability to move the feet and legs rapidly or accurately.

Eye-Hand Coordination: Ability to control accurately the movements of the hands by what the eyes see. It does not necessarily involve speed.

Foot-Hand-Eye Coordination: Ability to control accurately the simultaneous movements of hands and feet by what the eyes see. This does not necessarily involve speed. Eye-hand coordination should always be rated when this item is rated.

Work rapidly for long periods: Ability to work at high speed during the entire working period. It does not involve conservation of energy output, but simply rate of performance.

Strength of Arms: Ability to perform work requiring strong muscles in the arms from elbow to shoulder, arms such as are primarily involved in grasping, holding, pushing, pulling, twisting, turning, or carrying objects. It does not involve use of arm from elbow to shoulder as a primary muscular activity.

Strength of Back: Ability to perform work requiring strong muscles in the back and shoulders such as are primarily involved in lifting, carrying, pushing, pulling, carrying or throwing objects.

Strength of Neck: Ability to perform work requiring strong muscles in the neck and shoulders such as are primarily involved in such activities as lifting objects from the floor, pushing with back and shoulders, or striking blows with edge of hand.

Strength of Legs: Ability to perform work requiring strong, well-developed muscles in legs and thighs, ankles, and feet, such as are primarily required in such activities as lifting objects by knee action, operating pedals requiring pressure, gripping or pulling with the knees and legs, or extensive climbing, walking, kneeling, standing or crawling.

Dexterity of Fingers: Ability to move the fingers, or manipulate objects with the fingers, rapidly or accurately. This is not to be confused with the use of the fingers as part of whole-hand movement.

Dexterity of Hands and Arms: Ability to move hands and arms rapidly or accurately.

Dexterity of Feet and Legs: Ability to move the feet and legs rapidly or accurately.

Eye-Hand Coordination: Ability to control accurately the movements of the hands by what the eyes see. It does not necessarily involve speed.

Foot-Pedal-Eye Coordination: Ability to control accurately the simultaneous movements of hands and feet by what the eyes see. This does not necessarily involve speed. Eye-hand coordination should always be noted when this item is noted.

Coordination of Independent Movements of Both Hands:

Ability to move the right and left hands independently and at the same time; doing one thing with one hand while doing something else with the other hand. Does not necessarily involve vision.

Estimate Size of Objects: Ability to make accurate

judgments of dimensions such as length, breadth, depth, height, or thickness, or to estimate general over-all size or area.

Estimate Quantity of Objects: Ability to make accurate judgments of quantity or capacity of objects in terms of weight, number or volume.Perceive Form of Objects: Ability to distinguish whether objects are of the correct shape or outline, or to conceive generally in terms of shape.Estimate Speed of Moving Objects: Ability to make accurate judgments of the rate of motion of a moving object in relation to other moving objects or to a fixed point.Keeness of Vision: Ability to perceive or recognize objects, or locate points at a distance, or to make accurate discriminations through the use of vision.Keeness of Hearing: Ability to distinguish accurately, differences or similarities in the pitch, intensity, or quality of sounds, or to recognize a particular sound.Sense of Smell: Ability to distinguish similarities or differences in the intensity or quality of odors, or to recognize a particular odor.Sense of Taste: Ability to distinguish accurately differences or similarities in the intensity or quality of tastes, or to recognize a particular taste. Any estimations arrived at through the sense of taste should be rated in addition when this item is rated.Touch Discrimination: Ability to judge accurately through the use of touch; sensitivity of fingers or other parts of body to smoothness, roughness, contour, and other surface qualities of objects.

Coordination of Independent Movements of Both Hands:
Ability to move the right and left hands independently and at the same time; doing one thing with one hand while doing something else with the other hand. Does not necessarily involve vision.

Estimation of Size of Objects: Ability to make accurate judgments of dimensions such as length, breadth, depth, height, or thickness, or to estimate weight over-all size of area.

Estimation of Quantity of Objects: Ability to make accurate judgments of quantity or capacity of objects in terms of weight, number or volume.

Perceptive Form of Objects: Ability to distinguish whether objects are of the correct shape or outline, or to conceive accurately in terms of shape.

Perceptive Speed of Moving Objects: Ability to make accurate judgments of the rate of motion of a moving object in relation to other moving objects or to a fixed point.

Perceptive of Vision: Ability to perceive or recognize objects, or locate points at a distance, or to make accurate discriminations through the use of vision.

Perceptive of Hearing: Ability to distinguish accurately differences or similarities in the pitch, intensity, or quality of sounds, or to recognize a particular sound.

Perceptive of Smell: Ability to distinguish similarities or differences in the intensity or quality of odors, or to recognize a particular odor.

Perceptive of Taste: Ability to distinguish accurately differences or similarities in the intensity or quality of tastes, or to recognize a particular taste. Any estimations arrived at through the sense of taste should be rated in addition when this item is tested.

Perceptive of Touch: Ability to judge accurately through the use of touch; sensitivity of fingers or other parts of body to smoothness, roughness, contour, and other surface qualities of objects.

Muscular Discrimination: Ability to make judgments on the basis of muscular sensitivity, such as is required in estimating weight by lifting, in estimating resistance by pushing or pulling, in sensing position of or guiding body members without using eyes, or in regulating pressure of body members as in the use of pedals, hammering, etc.

Memory for Details (Things): Ability to remember or recall concrete details, such as size, color, price, quantity, order of complex assembly, job specification items, etc.

Memory for Ideas (Abstract): Ability to remember principles, ideas, or theories behind a job, including memory for plans, policies, processes, etc.

Memory for Oral Directions: Ability to remember a series of directions or other information given orally.

Memory for Written Directions: Ability to remember a series of directions or other information which has been read.

Arithmetic Computation: Ability to do arithmetic or higher mathematics. Occupations which involve analysis or interpretation of quantitative statistical data, but which do not actually involve arithmetic computation should also be rated for this item.

Intelligence: Ability to reason and make judgments. Intelligence is an over-all term referring to problem-solving, ability and involving reasoning, judgment, memory, attention, alertness, versatility, inventiveness, etc.

Adaptability: Ability to adjust readily to new and changing situations in the job. A sum-total of physical, temperamental and intellectual flexibility.

Ability to Make Decisions: Ability to consider the evidence and reach some conclusion without undue delay.

Ability to Plan: Ability to recognize and comprehend what things are to be done to achieve a specific end, and to decide upon, set up, and coordinate procedures for attaining that result; ability to organize ideas or things.

Generalization: Ability to make judgments on the basis of numerous activities, such as in repeated in testing weight by lifting, in estimating resistance by pushing or pulling, in varying position of or guiding body members with out using eyes, or in regulating pressure of body members in the use of pedals, levers, etc.

Memory for Details (Factual): Ability to remember or recall concrete details, such as size, color, price, quantity, view of complex assembly, job position, etc.

Memory for Ideas (Abstract): Ability to remember principles, laws, or theories dealing a job, in- cluding memory for plans, policies, processes, etc.

Memory for Oral Information: Ability to remember a series of directions or other information given orally.

Memory for Written Information: Ability to remember a series of directions or other information which has been read.

Estimate Calculation: Ability to do arithmetic or higher mathematics. Operations which involve analysis or interpretation of quantitative statistical data, but which do not actually involve arithmetic operations should also be rated for this item.

Intelligence: Ability to reason and make judgments. Intelligence is an over-all term referring to problem-solving, ability and involving reasoning, judgment, memory, attention, alertness, versatility, inventiveness, etc.

Adaptability: Ability to adjust readily to new and changing situations in the job. A sub-total of physical, perceptual and intellectual flexibility.

Ability to Make Conclusions: Ability to consider the evidence and reach some conclusion without undue delay.

Ability to Plan: Ability to recognize and comprehend what things are to be done to achieve a specific end, and to make a plan, set up, and coordinate procedures for attaining that result; ability to organize ideas or plans.

Initiative: Ability to recognize the implications of a work situation and to act upon the needs of the situation without specific instructions.

Understanding of Mechanical Devices: Ability to comprehend and put into use the principles of mechanical structure and operation; mechanical insight or ingenuity.

Attention to Many Items: Ability to keep the mind on many parts of a job at one time, or to shift the attention from one thing to another readily.

Oral Expressions: Ability to express one's self orally in clear and effective manner. Any activity requiring spoken words should be considered for rating under this characteristic.

Skill in Written Expression: Ability to present information or ideas clearly in writing.

Tact in Dealing with People: Ability to use diplomacy in human relations of any sort so as to obtain or retain respect, good will, cooperation, etc.

Memory of Names and Persons: Ability to recognize or recall names of persons by means of appearance, voice, or other information known about them.

Personal Appearance: Personal looks, grooming, attire, neatness, or attractiveness.

Concentration Amidst Distractions: Ability to carry on a job amidst noise, interruptions, or other disturbing influences.

Emotional Stability: Ability to remain calm and self-controlled under all conditions.

Work Under Hazardous Conditions: Ability to carry on work under conditions of hazard which may result in physical injury.

Estimate Quality of Objects: Ability to judge the quality of workmanship or of material. Since the estimation of quality usually involves the application of one of the special senses, or the ability to make estimations and discriminations of a more specific nature, rate all such related items in addition to this characteristic.

Intuitive ability is the ability to know the truth of a proposition and to act upon the truth of the proposition without logical reasoning.

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Intuitive ability is the ability to know the truth of a proposition and to act upon the truth of the proposition without logical reasoning.

Intuitive ability is the ability to know the truth of a proposition and to act upon the truth of the proposition without logical reasoning.

Work Under Unpleasant Physical Conditions: Ability to work on job under conditions affecting physical comfort.

Color Discrimination: Ability to distinguish or recognize similarities or differences in colors, or in the shades, tints, or other values of the same color; to recognize a particular color sought; or to recognize and create harmonious color combinations; or to mix or match colors.

Ability to Meet and Deal with the Public: Ability to meet and deal with the public, and to establish and maintain agreeable relations.

Height: Specific requirement of height within fairly definite limits due to elements performed on the job.

Weight: Specific requirement of weight within fairly definite limits, due to elements performed on the job.¹

All or most of the characteristics listed on the form enter into or control skill. The degree of skill required of a worker for successful performance is a primary consideration in a study of job demands. This indicates that a study of compiled data on required characteristics, in connection with jobs under consideration, will provide comparison. Information is taken directly from completed U.S.E.S. Worker Characteristics Forms and compiled in order that an over-all view of demanded worker qualities can be gained.

A grouping together of Worker Characteristics data from forms available on jobs performed by the blind is shown in Figure X, Page 49. The degree to which characteristics are

¹Training and Reference Manual for Job Analysis, U. S. Employment Service, Department of Labor, Occupational Analysis and Industrial Services Division (Washington, D. C.: Government Printing Office, 1944), pp. 45-52

1. The first step in the process of determining the color of a material is to observe the material under natural light. This is because the color of a material can change depending on the lighting conditions.

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[illegible]

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460145

1. Complete the following sentences:

all people in the world are equal

42 sulfatocyanide holds at same rate. 64 sec. 2 min 11

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED
DATE 08-01-2001 BY 60322 UCBAW/STP

FIGURE 1.
CHECK LIST SHOWING WORKER CHARACTERISTICS
REQUIRED ON JOBS PERFORMED BY THE BLIND

[illegible]

Work Rapidly for long periods	
Strength of hands	
Strength of arms	
Strength of back	
Strength of legs	
Dexterity of fingers	
Dexterity of hands and arms	
Dexterity of foot and leg	
Eye-hand Coordination	
Foot-hand-eye Coordination	
Coordination of both hands	
Estimate size of objects	
Estimate quantity of objects	
Perceive form of objects	
Estimate speed of moving objects	
Keeness of vision	
Keeness of hearing	
Sense of smell	
Sense of taste	
Touch discrimination	
Muscular discrimination	
Memory for details (things)	
Memory for ideas (abstracts)	
Memory for oral directions	
Memory for written directions	
Arithmetic Computation	
Intelligence	
Adaptability	
Ability to make decisions	
Ability to plan	
Initiative	
Understanding mechanical devices	
Attention to many items	
Oral expression	
Skill in written expression	
Tact in dealing with people	
Memory of names and persons	
Personal appearance	
Concentration amidst distractions	
Emotional stability	
Work under hazardous conditions	
Estimate quality of objects	
Unpleasant physical conditions	
Color discrimination	
Ability to meet and deal with public	
Height	Point Value
Weight	

required for each job is shown. The material is accumulated on the chart to give a composite picture of the demands that the jobs place upon workers as a group.

Figure XI, Page 51, is a similar collective chart. On this the composite data from Worker Characteristics Forms on the several jobs in general industry is shown. Here, too, the demands of a particular job are shown, while a collective view of demanded characteristics of workers as a group in general industry, appears. The information applied on the Worker Characteristics Form, like that on the Physical Demands Form, is gathered particularly for use in matching workers and occupations. When this is done, individual qualities like those demanded on a job analysis can be matched with the given job. However, as a tool for discovering over-all job demands, the charted information cannot be applied without assigning numerical values to the degrees used when the chart is checked. It is apparent that characteristics listed on the form are of several different values when they are considered in matching against different jobs. For example, the characteristic of "strength of arms" would have a totally different value when matched against the two jobs "ditch-digger" and "executive". Likewise, the characteristics would have different weights when applied against jobs in general. Examples would be "Sense of Smell" and "Adeptability". Because no grounds for weighting are available, no attempt is made here to weight characteristics,

required for each job is shown. The material is arranged
 listed on the chart to give a composite picture of the
 demands that the jobs place upon workers as a group.
 Figure 11, page 51, is a similar collective chart.
 On this the composite data from twenty characteristics
 forms on the several jobs in general industry is shown.
 Here, too, the demands of a particular job are shown, while
 a collective view of demanded characteristics of workers as
 a group in general industry, appears. The information applied
 on the former Characteristics Form, like that on the Physical
 Demands form, is gathered particularly for use in matching
 workers and occupations. When this is done, individual
 qualities like those demanded on a job analysis can be
 matched with the given job. However, as a tool for discover-
 ing overall job demands, the chart information cannot be
 applied without assigning numerical values to the degrees
 used when the chart is checked. It is apparent that
 characteristics listed on the form are of several different
 values when they are considered in matching against different
 jobs. For example, the characteristic of "strength of arms"
 would have a totally different value when matched against
 the two jobs "ditch-digger" and "executive". Likewise, the
 characteristics would have different values when applied
 against jobs in general. Examples would be "sense of smell"
 and "adaptability". Because no grounds for weighting are
 available, no attempt is made here to weight characteristics.

FIGURE XI
CHECK LIST SHOWING WORKER CHARACTERISTICS
REQUIRED ON JOBS PERFORMED IN GENERAL INDUSTRY

[illegible]

rather they are considered to be of equal value.

The degree markings, O, C, B, and A by the U.S.E.S. have no numerical value. The limitations of the degrees are subjective and may vary in the minds of every analyst. An attempt is made here to gather some rough comparison by merely giving the degree markings the numerical values as follows:

O equals 0
C equals 1
B equals 3
A equals 5

When the values mentioned are applied to the degrees of the characteristics scale, it is possible to obtain a rough numerical value for each job and a rough numerical value for each characteristic as it applies to all of the jobs. Such numerical values are shown on the charts in Figures X and XI, Pages 49 and 51. A first glance at these values demonstrates a wide difference in application of the degree markings from analyst to analyst. A total absence of marking by an analyst or a simple marking of all characteristics with a similar degree, indicates lack of care in completing the form and seriously limits accuracy. On the assumption that individual differences in judgment compensate for each other, some data is forthcoming when the jobs are considered collectively.

The job receiving the highest numerical value - 60 - is that of Mop Sewer appearing in the group of jobs performed by the blind. The job of Resin Bin Loader, in the general

values they are considered to be of equal value.

The degree markings, O, I, II, and A by the S.M.A.S. have no numerical value. The limitations of the degrees are subjective and may vary in the minds of every analyst. An attempt is made here to further some rough comparison by merely giving the degree markings the numerical values as follows:

O	degree 0
I	degree 1
II	degree 2
A	degree 3

When the values mentioned are applied to the degrees of the characteristic scale, it is possible to obtain a rough numerical value for each job and a rough numerical value for each characteristic as it applies to all of the jobs. Such numerical values are shown on the charts in figures X and XI, pages 49 and 51. A first glance at these values demonstrates a wide difference in application of the degree markings from analyst to analyst. A total absence of marking by an analyst or a single marking of all characteristics with a similar degree, indicates lack of care in completing the form and seriously limits accuracy. On the assumption that individual differences in judgment compensate for each other, some data is forthcoming when the jobs are considered collectively.

The job receiving the highest numerical value - 60 - is that of Boy Scout appearing in the group of jobs performed by the blind. The job of train ship leader, in the general

industry group has a value of 55. Only the one job, Mop Sewer, has a score in excess of that amount.

The average numerical score for jobs performed by the blind is 38.5 as compared to 42.5 in general industry. The average score of all of the jobs is 38.3. Eleven out of the twelve jobs from general industry which received attention by analysts, received scores in excess of the 38.3 average. Thirteen out of the eighteen analyzed jobs from the group performed by the blind, received scores in excess of the average. It would appear from this that the jobs in general industry require greater degrees of skill than is required on jobs performed by the blind. This impression may be imposed by inaccuracies or carelessness on the part of the analyst rather than in job differences. Appearance of the chart would indicate that this is so. Eighteen of the 34 jobs in the group performed by the blind included Worker Characteristics Data. Twelve of the 31 jobs in the group selected from general industry included Worker

Characteristics Data.

Figures and text -

Applying these values to the number of hours necessary for a worker, who is physically and mentally normal and who has a reasonable amount of school education, to perform the operation, conforming to certain minimum standards of quality and quantity, and to do so under the existing conditions. The physical characteristics of the learner, such as height, weight, length of fingers or of limbs, should not be such as to make his type unsuitable for the demands of the job. It is assumed that the learner passed is intelligent and under

Industry group has a value of 33. Only one job, however, has a score in excess of 30.

The average mechanical score for jobs performed by the blind is 33.5 as compared to 43.8 in general industry. The average score of all of the jobs is 33.5. Eleven out of the twelve jobs from general industry which rated 30 or

less by analysis, received scores in excess of the 33.5 average. Thirteen out of the eighteen analyzed jobs from the group performed by the blind, received scores in excess of the average. It would appear from this that the jobs in general industry require greater degrees of skill than is required on jobs performed by the blind. This impression may be further supported by inspection of the scores of the analyzed jobs in too difference. Awareness of the chart would indicate that this is so. Eleven of the 24 jobs in the group performed by the blind included Worker Characteristics Data. Twelve of the 31 jobs in the group selected from general industry included Worker

Characteristics Data.

The following table shows the scores for the jobs in the group selected from general industry which included Worker Characteristics Data. The scores for the jobs in the group performed by the blind which included Worker Characteristics Data are shown in the following table.

CHAPTER VII

COMPARISON OF LEARNING TIME

Whenever a job is begun, some time is required to provide the worker with knowledge of the intricacies of the job itself or its surroundings. On some jobs, this time is only that which is required to familiarize him with his immediate surroundings and with processes of the very lowest grade. A job such as Carton-Packer might be in this class. On other jobs, familiarity with operations and basic information involved may be so difficult to acquire that years of study or experience are needed before mastery of the job can be claimed. Jobs like "machinist" or "metallurgist" might be in this latter class. It is recognized that jobs in the first mentioned group are of a very low skilled nature, while jobs of the type later mentioned are those requiring high degrees of skill. Learning time is a factor in the measurement of skills and, consequently, a factor in the measurement of job demands in all types of job analysis.

Learning Time, as a factor in skill, is described by Stigers and Reed -

Learning time refers to the number of hours necessary for a beginner, who is physically and mentally normal and who has a reasonable common school education, to perform the operation, conforming to certain minimum standards of quality and quantity, and to do so under the existing conditions. The physical characteristics of the learner, such as height, weight, length of fingers or of limbs, should not be such as to make his type unsuited for the demands of the job. It is assumed that the learning period is intensive and under

CONTRAST OF LEARNING TIME

Whenever a job is begun, some time is required to provide the worker with knowledge of the intricacies of the job itself or its surroundings. On some jobs, this time is only that which is required to familiarize him with his immediate surroundings and with processes of the very lowest grade. A job such as Carton-Packer might be in this class. On other jobs, familiarity with operations and basic information involved may be so difficult to acquire that years of study or experience are needed before mastery of the job can be obtained. Jobs like "mechanical" or "retail" might be in this latter class. It is recognized that jobs in the first mentioned group are of a very low skilled nature, while jobs of the type later mentioned are those requiring high degrees of skill. Learning time is a factor in the measurement of skills and, consequently, a factor in the measurement of job demands in all types of job analysis. Learning time, as a factor in skill, is described by

Stigler and Reed -

Learning time refers to the number of hours necessary for a beginner, who is physically and mentally normal and who has a reasonable common school education, to perform the operation, according to certain minimum standards of quality and quantity, and to do so under the existing conditions. The physical characteristics of the learner, such as height, weight, length of fingers or of limbs, should not be such as to make this type unsuited for the demands of the job. It is assumed that the learning period is intensive and under

the direction of a capable teacher or trainer. Learning by "absorption" alone is not included or recognized. Learning time in hours has been found to be more accurate, more flexible, and more satisfactory than time expressed in terms of days and weeks.¹

Experience and Learning Time are interchangeable in Job Evaluation and are equal one to the other. In U.S.E.S. Job Analyses, "Experience" is used. In the Analyst's Workbook, experience is defined:

Experience may be considered as any related job, either of equivalent or lesser skill, in which an individual can secure the physical and mental abilities required to fulfill the performance requirements of a job. A job for which no previous experience is necessary is regarded as an entry job even though it may require a large amount of previous training. A study of the experience necessary for a job is essential to job placement from both a recruitment and an upgrading standpoint.²

Along with each completed Job Analysis from the U.S.E.S., a bare statement of time required to gain mastery of a job is included. These experience requirements are sometimes omitted from the analysis. The analysis forms provide for listing of various types of experience, such as "Same Job" or "Similar Job". Also, an "RNP" listing is given and refers to the time required by an experienced worker to "Reach Normal Production" if he is transferred from similar work to the specific job. Figure XII, Page 56 is arranged to show the experience required from the U.S.E.S. Analyses.

¹M. F. Stigers and E. G. Reed, The Theory and Practice of Job Rating (New York and London: McGraw-Hill Book Company, Inc., 1944), pp. 57-58.

²Guide for Analyzing Jobs, U. S. Department of Labor, 1944, Reprinted 1950.

the direction of a capable leader or trainer. Learning by "assumption" alone is not included or recognized. Learning time in hours has been found to be more accurate, more reliable, and more satisfactory than time expressed in terms of days and weeks.

Experience and Learning Time are interchangeable in Job Evaluation and are equal one to the other. In U.S.E.A. Job Analysis, "Experience" is used. In the Analyst's work-book, experience is defined:

Experience may be considered as any related job, either of equivalent or lesser skill, in which an individual has acquired the physical and mental abilities required to fulfill the performance requirements of a job. A job for which no previous experience is necessary is regarded as an entry job even though it may require a large amount of previous training. A study of the experience necessary for a job is essential to job placement from both a training and an upgrading standpoint.

Along with each completed Job Analysis from the U.S.E.A., a bare statement of time required to gain mastery of a job is included. These experience requirements are sometimes omitted from the analysis. The analysis forms provide for listing of various types of experience, such as "same job" or "similar job". Also, an "EMP" listing is given and refers to the time required by an experienced worker to "reach normal production" if he is transferred from similar work to the specific job. Figure III, page 66 is attached to show the experience reported from the U.S.E.A. Analysts.

U. S. Bureau of Labor Statistics, Washington, D. C. 20001
 of the Bureau of Labor Statistics, Washington, D. C. 20001
 Inc., 1944, pp. 27-28.

Source for Analysis Job, U. S. Department of Labor, 1944, Reprinted 1950.

FIGURE XII

EXPERIENCE REQUIRED

Jobs Performed by the Blind

Sewing Mach. Oper.	#3000004	3 wks.
Sewing Mach. Oper.	#0000006	2 wks.
Basket Maker	#1100509	1 mo.
Chair Caner, Hand	#1213	1 mo.
Chair Caner, Machine	#013699	1 mo.
Mattress Filler	#403171	2 mos.
Chair Caner, Hand	#013698	2 mos.
Sewer	#301610	6 mos.
Broom Binder	Spec. Study	6 mos.
Mop Sewer	Spec. Study	6 mos.
Chair Caner - Hand	#013977	6 mos.
Suite Sewer	#301531	3 yrs.
Sewer	#900759	2 yrs.
Hampster Maker	#102328	2 yrs.
Cushion Sewer	#301528	2 yrs.
Basket Maker	#102229	2 yrs.
Basket Maker	#102324	2 yrs.
Basket Maker	#102902	2 yrs.
Basket Maker	#102875	2 yrs.
Basket Maker	#102926	2 yrs.
Carnett Mach. Oper.	#800727	3 yrs.
Upholstery Sewer	#1401177	4 yrs.

Jobs Performed in General Industry

Bone Drier Oper.	#1201739	2 wks.
Neel Scorer	#302789	1 mo.
Water-Mangle Oper.	#Va-205	3 mos.
Feltting Mach. Oper.	#204362	3 mos.
Drop Hammer Oper.	#700722	3 mos.
Turret-Lathe Oper.	#1203176	6 mos.
Stock Barrel Insp.	#600499	6 mos.
Flour Sifter	#601726	6 mos.
Buffer III	#304510	6 mos.
Silverer (Mirror)	#606597	1 yr.
Machine Molder	#400831	1 yr.
Inspector (Pelt Hat)	#102492	1 yr.
Ham Cutter	#303327	1 yr.
Flour Sifter	#301953	1 yr.
Embosser	#204481	1 yr.
Doughnut-Mach. Oper.	#501167	1 yr.
Cushion Builder	#A-88	1 yr.
Belt Bender Oper.	#900585	1 yr.
Power Shear Oper.	#205323	3 yrs.
Candy Coater	#600953	4 yrs.

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III. RESULTS

[illegible]

Those jobs on which "Experience" is omitted from the analyses have been dropped from the listing. In all cases where experience is not stated in the analyses, it is assumed that the item was skipped rather than that no experience was required. In all cases where experience of different types are given, only that required to equip an entry worker¹ was used.

Figure XII, Page 56 is arranged to show jobs in groups according to the time required for learning. Of the jobs performed by the blind, 8.7% appear in the first group, while 5.0% appear in this group from the jobs in general industry. The average experience on all listed jobs is 13.5 months. The average for jobs performed by the blind is 15.4 months as compared to 11.3 months for the jobs in general industry. Fifty-two percent of the jobs performed by the blind require more than 13.5 months of training as compared to 10% in general industry. Twelve jobs performed by the blind require one year or more experience while eleven jobs from general industry require that amount of experience. From this we can conclude that experience requirements in connection with the jobs performed by the blind are somewhat higher than for jobs in general industry.

¹If no occupational experience is necessary, this indicates that the job is open to the inexperienced worker. However, an inexperienced applicant may be required to possess training to compensate for his lack of work experience. The job is known as an "entry job".

These jobs on which "Experience" is omitted from the analyses have been dropped from the listing. In all cases where experience is not stated in the analyses, it is assumed that the item was assigned rather than that no experience was required. In all cases where experience of different types are given, only that required to secure an entry worker was used.

Figure XII, Page 88 is arranged to show jobs in groups according to the time required for learning. Of the jobs performed by the blind, 8.7% appear in the first group, while 8.0% appear in this group from the jobs in general industry. The average experience on all listed jobs is 13.8 months. The average for jobs performed by the blind is 11.4 months as compared to 13.8 months for the jobs in general industry. Fifty-two percent of the jobs performed by the blind require more than 13.8 months of training as compared to 10% in general industry. Twelve jobs performed by the blind require one year or more experience while eleven jobs from general industry require less than one year of experience. From this we can conclude that experience requirements in comparison with the jobs performed by the blind are somewhat lighter than for jobs in general industry.

If no occupational experience is necessary, this indicates that the job is open to the inexperienced worker. However, an inexperienced worker may be required to possess training or experience for his lack of work experience. The job is known as an "entry job".

CHAPTER VIII

RANKING OF JOB DEMANDS ACCORDING TO A POINT EVALUATION

Up to this point, all information and measuring data applied to the evaluation of job demands has come directly from U.S.E.S. Job Analyses. The material, although it may be adequate for use in the Employment Service, is not well suited to a study of comparative job demands. An attempt is made to apply a point evaluation technique which should better indicate a ranking of the studied jobs, according to their degree of difficulty.

In the application of a point rating system from a study of the demands of jobs, three things must be present: (1) Complete job descriptions must be available on each job studied; (2) Accurate, understandable measuring standards must be had; and (3) Competent judges must make the evaluations. An attempt has been made to gain all three by using published data on jobs, published information on measuring standards and by finding six judges with experience in job evaluation.

Only one source is available from which job descriptions might be obtained, where analyses of jobs performed by blind workers and jobs performed in general industry are treated similarly. Although job analyses are available which have been prepared in special workshops on jobs which are performed by the blind, they are independent analyses and are not related to the abundance of job analyses which have been

ANALYSIS OF THE DEMANDS
ACCORDING TO A POINT EVALUATION

Up to this point, all information and material have been applied to the evaluation of job demands and have been directly from U.S.N.C. job analyses. The material, although it may be adequate for use in the Employment Service, is not well suited to a study of comparative job demands. An attempt is made in this point evaluation technique which should better indicate a ranking of the studied jobs, according to their degree of difficulty.

In the application of a point rating system from a study of the demands of jobs, three things must be present: (1) Complete job descriptions must be available on each job studied; (2) A rating scale, understandable in meaning and use; and (3) Competent judges must make the evaluations. An attempt has been made to gain all three by rating published data on jobs, published information on measuring standards and by listing six judges with experience in job evaluation.

Only one source is available from which job descriptions might be obtained, where analyses of jobs performed by blind workers and jobs performed in general industry are treated similarly. Although job analyses are available which have been prepared in special conditions on jobs which are not known by the blind, they are independent analyses and are not related to the standards of job analyses which have been

prepared on jobs in general industry. There are no analyses available from which data of a similar nature can be drawn which applies to both, jobs in industry and in special workshops, except analyses from the U.S.E.S. The full job descriptions made by analysts of the U.S.E.S. which are used in making up Occupational Dictionary data are usually quite useable and more or less sufficient for a fair judgment of job facets. Unfortunately, the analyses are available on only a limited number of jobs. Of the many jobs performed by the blind, only thirty-four analyses were available and many of these were made on jobs of a similar nature. An orderly random selection of jobs from general industry was attempted by electing to use analyses of jobs appearing at the top of every second page of the Occupational Dictionary list of "semi-skilled" occupations. Many of these were unavailable - only thirty-one of the total group could be obtained. None of the complete analysis material on these jobs is published. It can be borrowed through local offices of the U.S.E.S. from the Washington office. The material borrowed is the original form filled out by the U.S.E.S. analysts in the field. The material is sometimes in pencil, sometimes in crayon, and sometimes carefully typed, spelled and punctuated. The copies of the analyses are the only copies in existence - thus, they are closely husbanded by the U.S.E.S. They could be retained for only a short period. Several copies of the pertinent data and job descriptions taken from analyses were made and distributed to individuals

prepared on jobs in general industry. There are no analyses available from which data of a similar nature can be drawn which applies to both, jobs in industry and in general workshop, except analyses from the U.S.E. The full job descriptions made by analysts of the U.S.E. which are used in making up Occupational Dictionary data are usually quite usable and more or less sufficient for a fair judgment of job factors. Unfortunately, the analyses are available on only a limited number of jobs. Of the many jobs performed by the firm, only thirty-four analyses were available and many of these were made on jobs of a similar nature. An orderly random selection of jobs from general industry was attempted by selecting to use analyses of jobs appearing at the top of every second page of the Occupational Dictionary list of "semi-skilled" occupations. Many of these were unavailable - only thirty-one of the total group could be obtained. Some of the complete analysis material on these jobs is published. It can be borrowed through local offices of the U.S.E. from the Washington office. The material borrowed is the original form filled out by the U.S.E. Analysts in the field. The material is sometimes in pencil, sometimes in eraser, and sometimes carefully typed, spelled and punctuated. The number of analyses are not equal in existence - that, they are closely furnished by the U.S.E. They could be retained for only a short period. Several copies of the pertinent data and job descriptions taken from analyses were made and distributed to individuals

for use in making factor evaluations. Descriptions of rating factors with a rating scale for each job was prepared for each analyst. The rating scale on which analysts scored their judgment of degrees to which a factor applied in connection with a job was a 5-point scale to correspond with the 5-degree limits for each factor. A copy of a single page of material like that sent to analysts appears in Appendix C, Page 89.

Of the several systems of job rating which are in general use, the point system of rating was chosen because this system permits job rating without consultation between judges. The point scale used in this study is that published by Hibbs.¹ The scale was chosen for its comparatively small number of factors to be applied and because of the simplicity of element descriptions. The factors or elements rated are Skill, Effort, Responsibility and Working Conditions. These are sub-divided and limited according to the following definitions:

SKILL

Experience: Experience should include only the time required to attain normal output, and should not include time of apprenticeship and formal training, which properly belong under Education.

1st Degree: Requires training period of not more than three months.

2nd Degree: Training period of over three months but less than one year, is required.

3rd Degree: Requires from one to three years training.

4th Degree: Requires expert knowledge gained from training and practical experience extending over a period of from three to five years.

¹Ray E. Hibbs, Job Valuation by the Precision Method (Ray E. Hibbs and Associates, Minneapolis, Minn.: 1947).

For use in making factor evaluations. Descriptions of rating factors with a rating scale for each job are prepared for each analyst. The rating scale on which analysts scored their judgment of degree to which a factor applied in connection with a job was a 5-point scale to correspond with the 5-degree limits for each factor. A copy of a single page of material like that sent to analysts appears in

Appendix D, page 55.

Of the several systems of job rating which are in general use, the point system of rating was chosen because this system permits job rating without consultation between judges. The point scale used in this study is that published by Hilka. The scale was chosen for its comparatively small number of factors to be applied and because of the simplicity of element descriptions. The factors or elements rated are skill, effort, responsibility and working conditions. These are sub-divided and limited according to the following definitions:

Skill

Experienced: Experience should include only the time required to attain normal output, and should not include time of apprenticeship and formal training, which properly belong under Education.
1st Degree: Requires training period of not more than three months.
2nd Degree: Training period of over three months but less than one year, is required.
3rd Degree: Requires from one to three years training.
4th Degree: Requires expert knowledge gained from training and medical experience extending over a period of from three to five years.

5th Degree: Requires the highest type of expert knowledge gained from job training and practical experience over a period of more than five years.

Education: This factor appraises the necessary requirements for the use of graphs, drawings, shop mathematics, measuring instruments and trade information. The ability to speak and understand English is assumed to be present in all cases.

1st Degree: May require ability to read, write, add and subtract.

2nd Degree: Requires use of simple mathematics, such as addition and subtraction of fractions and decimals; the use of drawings and such measuring instruments as scales or caliper. Education equivalent of sixth grade.

3rd Degree: Requires shop math, chemical, physical or engineering formulas, a number of precision measuring devices or fairly involved drawings. Some trade information in a special field is required.

4th Degree: Advanced shop math, or a wide range of precision measuring devices, wide trade information, involved drawings, graphs and specifications are required. Equivalent to one year college or 4 years trade training.

5th Degree: Technical knowledge great enough to handle advanced mechanical, electrical or other technical problems. Approximately equivalent to four years of technical training at the college level.

Initiative and Ingenuity: In this factor, necessity for visualizing, planning and the ability to exercise ingenuity under changing conditions should be sought. The necessity for making decisions and laying out work should be appraised.

1st Degree: Ability to follow simple instructions involving practically no decisions; or where the operations are constantly supervised.

2nd Degree: Ability to follow details with occasional minor decisions. Supervision is available at all times. Exercise of ingenuity required only on rare occasions.

3rd Degree: Standard procedures or recognized operation methods are available but decisions may be required in determining the order of operations. General supervision is present. Small amount of planning may be required.

3rd Degree: Requires the highest type of expert knowledge gained from job training and practical experience over a period of more than five years.

2nd Degree: This factor requires the necessary re-quirements for the use of graphs, drawings, shop mathematics, measuring instruments and trade knowl-ledge. The ability to read and understand English is assumed to be present in all cases.

1st Degree: May require ability to read, write, add and subtract.

3rd Degree: Requires use of simple mathematics, such as addition and subtraction of fractions and decimals; the use of formulas and such measuring instruments as scales or caliper. Education equivalent of sixth grade.

2nd Degree: Requires shop math, chemistry, physics or engineering formulas, a number of mechanical measuring devices or fairly involved drawings. Some trade knowl-ledge in a specific field is required. Advanced shop math, or a wide range of practical measuring devices, with trade information, involved drawings, graphs and specifications are required. Equivalent to one year college or 4 years trade training.

1st Degree: Technical knowledge of shop math, electrical, mechanical, electronic, or other technical problems. Approx-imately equivalent to four years of technical training at the college level.

Initiative and Ingenuity: In this factor, necessarily the planning and the ability to execute ingeniously under changing conditions should be sought. The necessity for making decisions and taking action should be emphasized.

1st Degree: Ability to follow shop instructions involving practically no decisions or where the operations are constantly repeated.

2nd Degree: Ability to follow shop instructions with occasional minor decisions. Supervision is usually this at all times. Exercises of ingenuity required only on rare occasions.

3rd Degree: Requires procedures or recognized superior methods are available but decisions may be required in deter-mining the order of operations. General supervision is present. Small amount of planning may be required.

- 4th Degree: General methods of operation are available, but decisions involving the use of considerable judgment, and the planning and performance of unusual and difficult work, are required. Little supervision necessary.
- 5th Degree: Requires outstanding ability to plan and devise new methods and to meet new conditions with high degrees of ingenuity, initiative and judgment on very complicated jobs involving own work and that of others.

EFFORT

Mental or Visual Demand: The necessary degrees of mental alertness and visual concentration are sought. Consideration should be given to length of the work cycle, the necessary alertness and attention, and the coordination of manual dexterity with mental or visual attention.

- 1st Degree: Little mental or visual concentration necessary as the work is practically automatic; or it requires attention only at very infrequent intervals.
- 2nd Degree: Frequent mental or visual concentration required, the flow being intermittent, or where the work involves waiting for a process to complete a work cycle with little checking.
- 3rd Degree: Constant mental or visual concentration necessary, where continuous alertness is needed to watch repetitive work which requires constant attention.
- 4th Degree: Must coordinate a high degree of manual dexterity with close visual concentration for long periods; or must plan and lay out complex work requiring close mental and visual attention.
- 5th Degree: Must plan and lay out very complicated and careful work, requiring great mental or visual concentration.

Physical Demand: The degree of physical demand is sought. Consideration should be given to the relative amount and the continuity of the physical exertion inherent in the job as it is done, and also to the physical position for standing, sitting and lifting.

- 1st Degree: Requires little physical exertion. Comfortable working position.

General methods of observation are available, but definite limitations in the use of considerable judgment and the planning and execution of unusual and difficult work are required. Little supervision necessary. Repetitive outstanding ability to plan and devise new methods and to use new conditions of high degree of ingenuity, initiative and judgment on very complicated jobs involving two work and that of others.

EXPLANATION

Mental or Visual Work: The necessary degree of mental alertness and visual concentration are small. Consideration should be given to length of the work cycle, the necessary alertness and attention, and the absorption of mental dexterity with mental or visual attention.

1st Degree: Little mental or visual concentration necessary as the work is practically automatic or is repetitive attention only at very infrequent intervals. 2nd Degree: Frequent mental or visual concentration the time being infrequent, or where the work involves waiting for a process to complete a work cycle with little thinking.

3rd Degree: Constant mental or visual concentration necessary, where continuous attention is needed to which repetitive work which requires constant attention.

4th Degree: Just continuous a high degree of mental dexterity with close visual concentration for long periods; or part time and lay out similar work requires close mental and visual attention. 5th Degree: Just time and lay out very complicated and careful work, requiring great mental or visual concentration.

Physical Demand: The degree of physical demand is small. Consideration should be given to the relative amount and the magnitude of the physical exertion involved in the job as it is done, and also to the physical position for standing, sitting and lifting. 1st Degree: Requires little physical exertion. Considerable working position.

- 2nd Degree: Working with light weight material, or occasionally with average weight material which requires only light physical exertion or operating machines where machine time is greater than handling time.
- 3rd Degree: Working with light or average weight materials during majority of work period, or continuous activity such as running several machines where the handling time is approximately equal to machine times. Above normal physical exertion required.
- 4th Degree: Working with average or heavy weight material requiring considerable effort, severe physical strain for intermittent periods of short duration, or continuous strain of difficult work position.
- 5th Degree: Working with heavy material requiring continuous physical exertion. Continuous physical strain or intermittent extraordinarily severe strain.

RESPONSIBILITY

Spoilage of Materials: The responsibility for preventing damage, or waste, from carelessness, is sought. Give consideration to the cost of salvage, the expense of material and labor waste. (Average "probability" is sought rather than the maximum "possibility" of loss through carelessness.)

1st Degree: Loss would probably not exceed \$10.00

2nd Degree: Loss would seldom exceed \$100.

3rd Degree: Probable loss less than \$250.

4th Degree: Probable loss would seldom be more than \$500.

5th Degree: Probable loss would run to several thousand dollars.

Work of Others: The responsibility for instructing, assisting or directing the work of others is sought. This is not to be an appraisal of supervisory responsibility for results.

1st Degree: Not responsible for any but own work, except when training helpers or substitute workers.

2nd Degree: Responsible for instructing and directing "on the job" training 15 percent of the time or less. Or responsible for work of two general laborers or one semi-skilled employee.

1st Degree: Working with light weight material, or occasionally with average weight material which requires only light physical exertion or exerting machines where machine time is greater than handling time.

2nd Degree: Working with light or average weight material during majority of work period, or continuous activity such as running several machines where the handling time is approximately equal to machine time. Above normal physical exertion required.

3rd Degree: Working with average or heavy weight material requiring considerable effort, severe physical strain for intermittent periods of short duration, or continuous strain of difficult work position.

4th Degree: Working with heavy material requiring continuous physical exertion. Continuous physical strain or intermittent severe strain.

RESPONSIBILITY

Definition of Responsibility: The responsibility for an event is assigned to that person, or group of persons, who are directly or indirectly responsible for the event. It is the duty of the person or group of persons to prevent the event from occurring, or to correct it if it does occur. It is the duty of the person or group of persons to prevent the event from occurring, or to correct it if it does occur.

1st Degree: Loss with no responsibility assigned \$10.00.

2nd Degree: Loss with no responsibility assigned \$100.00.

3rd Degree: Loss with no responsibility assigned \$1000.00.

4th Degree: Loss with no responsibility assigned \$10000.00.

5th Degree: Loss with no responsibility assigned \$100000.00.

Work of Chapter: The responsibility for an event is assigned to that person, or group of persons, who are directly or indirectly responsible for the event. It is the duty of the person or group of persons to prevent the event from occurring, or to correct it if it does occur. It is the duty of the person or group of persons to prevent the event from occurring, or to correct it if it does occur.

1st Degree: Not responsible for any loss or work, except when training helpers or substitutes.

2nd Degree: Responsible for an event and directing "on the job" training in event of loss or loss. Or responsible for work of two general laborers or one semi-skilled employee.

- 3rd Degree: Responsible for instructing, directing or setting up, for up to 10 persons, up to 50 percent of the time. Employees in same occupation or occupations which are in line of advancement to the job being valued.
- 4th Degree: Responsible for a group of up to 25 employees, for instructing, directing and maintaining flow of work.
- 5th Degree: Responsible for a group of over 25 employees, for instructing, directing and maintaining flow of work.

WORKING CONDITIONS

Hazards to Self: Hazards of bodily injury and damage to health from the job or surroundings are sought. Consideration should be given to the place where the work is done, the machines and tools used, the material handled. Consider the possibility of injury even though none has occurred.

- 1st Degree: Hazards of injury or to health very small.
- 2nd Degree: Injuries unlikely, except for minor cuts and bruises. Hazards to health very slight.
- 3rd Degree: Exposed to lost-time injuries, such as eye injury from particles, loss of fingers, crushed hand or foot. Slight exposure to non-incapacitating occupational diseases.
- 4th Degree: Exposed to injuries or health hazards of an incapacitating nature, such as loss of arm or leg, or loss or impairment of vision.
- 5th Degree: Exposed to injuries or occupational diseases which might cause total disability or death.¹

Six judges volunteered to make the job ratings. They are drawn from the United States Employment Service; from the Pennsylvania State Board of Vocational Education; from Industry; and, in addition, three qualified individuals in work for the blind.

¹Ray E. Hibbs, Job Valuation by the Precision Method (Ray E. Hibbs and Associates, Minneapolis, Minn.: 1947).

3rd Degree: Exposed to low frequency, vibrating
of setting up, low up to 10 vibrations,
up to 50 vibrations of the day. Employees
in same occupation or occupation which
are in line of advancement to the job
being advised.
4th Degree: Exposed to a group of up to 10
vibrations, low frequency, vibrating
and maintaining flow of work.
5th Degree: Exposed to a group of over 10
employees, low frequency, vibrating
and maintaining flow of work.

WORKING CONDITIONS

Exposure to self: Hazards of bodily injury and damage
to health from the job or surroundings are possible. Con-
sideration should be given to the place where the work
is done, the machines and tools used, the material handled,
Consider the possibility of injury even though none has
occurred.

1st Degree: Hazards of injury or to health very
small.
2nd Degree: Injury is unlikely, except for minor
cuts and bruises. Hazards to health
very slight.
3rd Degree: Exposed to fast-time injuries, such as
eye injury from particles, loss of
fingers, crushed hand or foot. Slight
exposure to non-infectious contagious com-
municable diseases.
4th Degree: Exposed to injuries or health hazards
of an infectious nature, such as
loss of arm or leg, or loss of health-
ness of vision.
5th Degree: Exposed to injuries or occupational
diseases which might cause total
disability or death.

Six judges volunteered to make the job ratings. They
are drawn from the United States and from various
the Pennsylvania State Board of Vocational Education. The
industry; and, in addition, three qualified individuals in
work for the blind.

The task of ranking jobs was long and tedious in that 520 separate judgments had to be made by each analyst in connection with the rating of sixty-five jobs against eight elements. Each man was given a full set of job descriptions and eight matching job lists with appropriate scales for marking each factor.

Returns from the judges were in the form of check points on scales which would indicate the degree to which a given factor was judged to be involved in connection with a job. The check points had no numerical value. The check points were converted to point values and the point values were averaged for each job. The conversion was done by use of the chart shown in Figure XIII, Page 66. The charted returns in point values, according to the notion of the judges, is shown in Figure XIV, Pages 67, 68 and 69. When the numerical values from the six analysts were obtained, they were converted into a single score by calculation of the arithmetic mean.

The several jobs studied with corresponding calculated numerical values are listed in Figure XV, Page 70, in order of descending numerical worth. Those jobs which are frequently performed by blind workers are preceded by an asterisk. In the first quarter of the chart, 20.6% of the jobs performed by the blind, appear; while 29% of jobs performed in general industry, appear. In the second quarter, we find 29.4% of job performed by the blind as compared to 22.6% in general

The same of ranking jobs was found and relations in that the relative judgments had to be made by each analyst in connection with the rating of thirty-five jobs against eight elements. Each man was given a full set of job descriptions and eight matching job lists with corresponding series for marking each factor.

Statements from the judges were in the form of check points on scales which would indicate the degree to which a given factor was judged to be involved in connection with a job. The check points had no numerical value. The check points were converted to point values and the point values were averaged for each job. The conversion was done by use of the chart shown in Figure III, page 40. The plotted points in point values, according to the action of the judges, is shown in Figure IV, pages 67, 68 and 69. When the numerical values from the six analyses were obtained, they were converted into a single score by calculation of the arithmetic mean.

The several jobs studied with corresponding calculated numerical values are listed in Figure IV, page 70. In order to determine the relative merit of these jobs which are the primary determinant of blind workers are preceded by an asterisk. In the first chapter of the chart, 30.44 of the jobs performed by the blind, generally, while 39% of jobs performed in general industry, general. In the second chapter, we find 30.44 of the jobs performed by the blind as compared to 38.33 in general industry.

FIGURE XIII

SCORE CONVERSION CHART

	Degree				
	1	2	3	4	5
<u>SKILL</u>					
Experience	2-22	24-44	46-66	68-88	90-110
Education	2-14	16-28	30-42	44-56	58-70
Initiative and Ingenuity	2-14	16-28	30-42	44-56	58-70
<u>EFFORT</u>					
Mental or Visual Demand	2-8	10-16	18-24	26-32	34-40
Physical Demand	1-7	8-14	15-21	22-28	29-35
<u>RESPONSIBILITY</u>					
Spoilage of Materials	1-3	6-10	11-15	16-20	21-25
Work of Others	1-5	6-10	11-15	16-20	21-25
<u>WORKING CONDITIONS</u>					
Hazards to Self	2-6	10-16	18-24	26-32	34-40

TABLE NO. 10

TABLE NO. 11

TABLE NO. 12

TABLE NO. 13

TABLE NO. 14

TABLE NO. 15

FIGURE XIV (cont.)

Cushion Builder	Doughnut Mach. Oper.	Drop Hammer Operator	Edge Wire Former	Embossor	Feeling Mach. Oper.	Folder III	Flour Sifter Blender I	Flour Sifter #301933	Fur Cutter	Garnett Mach. Operator	Ham Cutter	Hamper Maker* #102394	Hamper Maker* #102326	Heel Scorer	Helical Spring Mach. Oper.	Inspector (Felt Hat)	Ironer (Crown)	Machine Folder Strip. Plate	Matress * Filler	Kop Sewer* (Spec. Study)	Kop Head Sewer* #902521	Kop Maker* #902522	Operator, Choking, Mach.	Pole Mach. Helper	Power Shear Operator I	Resin Bin Loader
1	1	1	1	2	1	1	1	2	1	3	1	3	2	1	1	1	1	2	2	2	1	1	1	2	1	1
1	1	3	1	1	1	1	2	3	1	3	3	3	3	1	2	0	1	1	1	1	1	1	1	1	2	1
2	2	1	1	2	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	1	2	1
2	1	1	1	3	2	1	1	3	2	3	2	3	2	1	2	1	1	3	3	2	2	1	2	2	2	3
36.7	33	36.7	22	47.7	29.3	22	33	47.7	25.7	58.7	33	51.3	55	22	33	22	22	40.3	29.3	33	25.7	22	25.7	36.7	40.3	35
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
0	1	0	0	0	0	0	1	2	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	1	2	2
0	1	1	0	3	2	1	1	2	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	2	2	1
1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
2	1	1	1	3	2	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
11.7	16.3	16.3	9.3	21	16.3	11.7	14	28	11.7	14	11.7	14	14	14	14	16.3	9.3	9.3	11.7	9.3	9.3	16.3	16.3	16.3	16.3	21
1	1	1	1	2	1	1	1	2	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2
1	1	1	1	2	2	1	2	3	2	2	2	3	3	2	2	1	1	1	1	1	1	1	1	2	2	2
1	1	1	1	2	2	1	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1	1	1	1	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
18.7	25.7	25.7	14	35	25.7	16.3	23.3	37.3	21	35	16.7	28	25.7	16.3	25.7	25.7	16.3	25.7	23.3	23.3	18.7	16.3	23.3	23.3	30.3	30.3
1	1	1	1	2	1	1	1	1	1	2	1	3	3	1	2	3	2	1	2	3	2	2	2	2	2	1
1	1	1	1	1	2	1	2	4	1	1	2	1	1	1	3	2	3	3	2	2	2	3	3	3	3	2
1	1	1	1	1	2	1	2	3	3	3	3	3	3	1	3	3	2	2	2	2	3	3	3	3	3	2
1	1	1	1	2	2	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
2	3	2	2	3	2	1	1	3	2	2	1	3	4	2	2	2	1	2	2	2	2	1	2	2	2	3
10.7	13.3	14.7	10.7	17.3	14.7	10.7	13.3	20	16	18.7	13.3	17.3	20	9.3	18.7	18.7	14.7	16	17.3	20	17.3	14.7	12	16	18.7	16
3	1	4	1	2	1	1	5	3	1	4	2	2	2	2	2	1	2	2	2	1	1	1	2	2	3	4
2	1	4	1	1	2	1	4	4	1	3	1	1	1	1	2	1	3	2	2	1	1	1	2	2	4	4
2	2	4	2	2	2	2	4	4	2	4	2	2	2	2	4	2	2	4	3	2	2	2	2	2	3	4
2	2	3	3	2	2	2	3	3	2	3	2	2	2	2	2	2	2	4	3	2	2	2	3	3	3	4
2	2	3	3	2	2	3	3	2	2	3	2	2	2	2	2	2	2	4	3	2	2	2	3	1	1	2
2	2	3	1	3	2	1	3	3	2	2	3	2	2	1	2	1	2	3	3	3	3	3	2	2	2	4
14	16.3	24.5	12.8	14	14	10.5	25.7	22.2	15.2	22.2	15.2	12.8	12.8	11.7	18.7	10.5	15.2	22.2	19.8	11.7	11.7	16.3	14	18.7	24.5	24.5
1	2	2	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2
1	1	2	1	2	2	0	0	0	0	1	0	1	1	1	2	0	1	2	1	1	1	1	0	2	2	2
2	3	4	1	4	4	0	5	5	2	5	2	2	2	4	4	0	3	2	2	1	1	1	1	1	2	2
1	1	1	1	1	1	1	2	2	1	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1
5.8	7.5	10	5	10.8	9.2	3.3	9.2	10.8	5.8	10.8	5	5.8	6.7	5.8	10	2.5	6.7	8.3	5.8	5	5	5	5	8.3	8.3	8.3
1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	2	2	1	2	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	2	2	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5	5.8	5	10	9.2	5	6.7	7.5	5	5.8	5	5.8	5	5	6.7	5	5	6.7	5.8	5	5	5	6.7	6.7	6.7	5.8
1	1	4	2	1	2	2	1	1	3	2	3	2	2	3	2	1	3	3	2	2	1	2	2	2	3	3
1	1	5	1	1	1	0	1	1	1	1	1	2	2	1	1	0	1	5	2	2	1	2	2	4	4	4
2	2	3	1	3	2	2	4	4	3	3	3	2	2	2	4	1	2	4	1	2	2	2	4	4	4	4
2	2	4	2	2	2	1	2	2	1	2	2	2	2	2	3	1	3	4	3	2	2	2	3	3	3	3
2	2	4	2	2	2	1	1	1	1	2	2	2	2	2	2	1	1	4	3	2	2	2	3	3	3	3
12	13.3	29.3	12	13.3	13.3	9.3	13.3	13.3	20	16	14.7	16	14.7	16	20	5.3	17.3	29.3	14.7	14.7	13.3	13.3	20	24	26.7	24
114.6	130.4	163.0	90.8	169.1	131.7	88.8	138.5	186.8	110.2	182.5	121.9	151.0	153.9	100.1	146.8	106.0	106.5	157.8	127.7	122.0	106.0	97.3	116.6	142.0	177.7	162.9

FIGURE XIV (cont.)

FIGURE XIV (cont.)																	
1st Class Power*	Sew. Mach. Oper.*	Sew. Mach. Oper.*	Sew. Mach. Oper.*	Sewer *	Silverer (Mirror)	Stack Barrel Inspector	Suite Sewer* #301531	Tube Mach. Oper. III	Turf. Mach.* #800802 Oper. (Manual)	Turret-Lathe Operator	Turter (Hand)* #1500153	Upholstery* Sewer #1401177	Water-Wangle Operator	Heaver* #1500211	Heaver I* #600452	Mean Point Value-Blind	Mean Point Value-Gen'l Industry
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
32	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
33	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
36	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
38	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
39	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
41	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
42	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
43	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
44	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
45	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
47	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
48	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
49	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
51	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
52	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
53	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
54	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
55	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
56	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
57	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
58	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
59	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
60	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
61	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
62	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
63	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
64	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
65	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
66	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
67	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
68	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
69	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
70	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
71	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
72	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
73	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
74	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
75	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
76	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
77	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
78	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
79	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
81	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
82	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
83	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
84	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
86	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
87	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
88	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
89	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
91	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
92	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
93	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
94	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
95	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
96	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
97	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
98	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
99	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
101	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
102	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
103	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
104	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
105	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
106	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
107	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
108	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
109	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
111	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
112	1	1	1	1													

FIGURE XV

JOB LISTED ACCORDING TO
DESCENDING NUMERICAL WORTH

Flour Sifter	186.8	Cushion Builder	114.6
*Garnett Machine	182.5	*Sewer #301610	113.8
Power Shear Oper.	177.7	*Weaver #1500211	113.5
Silverer	169.8	Fur Cutter	110.2
Embossor	169.1	Blanch. Mach. Oper.	109.1
Turret-Lathe Oper.	165.6	*Chair Caner #013699	107.8
Drop Hammer Oper.	163.0	*Broom Sewer	107.6
Resin Bin Loader	162.9	Ironer	106.5
*Basket Maker #102875	160.6	*Mop Sewer	106.0
*Basket Maker #102324	160.6	Inspector	106.0
Candy Coater	158.9	*Chair Caner #013398	105.3
*Basket Maker #102902	158.1	*Chair Caner #1213	104.0
Machine Molder	157.8	Buffer III	101.5
*Hamper Maker #102328	153.9	Heel Scorer	100.1
*Chair Caner #013977	153.7	*Mop Maker #902522	97.3
*Hamper Maker #102394	151.	Edge Wire Former	90.8
*Basket Maker #102399	150.5	Colorer	89.1
Helical Spring Oper.	146.8	Folder	88.8
*Basket Maker #102926	143.4	*Basket Maker #1100509	87.8
Belt Sander	142.8		
Pole Machine Oper.	142.0		
Water Mangle Oper.	141.3		
Flour Sifter	138.5		
*Basket Maker #1400912	136.3		
*Basket Maker #102229	134.3		
*Tuft. Mach. Oper.	133.9		
*Broom Winder-Spec.St.	133.8		
Felting Mach. Oper.	131.7		
*Weaver I #600452	131.3		
Doughnut Mach. Oper.	130.4		
*Tufter, Hand	128.7		
*Mattress Filler	127.7		
*Sewer	127.5		
*Upholsterer (Sewer)	127.2		
*Broom Winder #506705	124.5		
*Suite Sewer #301531	124.4		
Slack Barrel Insp.	124.1		
*Cushion Sewer	123.3		
*Mop Sewer	122.0		
Ham Cutter	121.9		
*Sew. Mach. Oper. 800806	119.6		
*Sew. Mach. Oper. 800804	118.7		
*1st Class Power Sew.	117.6		
Oper. Chucking Mach.	116.6		
Bone Drier	116.4		
Tube Mach. Oper.	116.0		

*Jobs performed by the blind

Build out ya basement adobe

industry. Again, 29.4% of jobs performed by the blind appear in the third quarter while 19.3% of general industry jobs appear. In the final quarter, 20.6% of jobs performed by the blind are found as compared to 29% of other jobs.

This latter information indicates that there is no great overall difference between demands experienced in connection with the two groups of jobs. The jobs from general industry, however, cluster at the two extremes, while the jobs performed by the blind cluster around the medium degrees of difficulty with respect to the total grouping.

The mean point value of all jobs studied is 130.5. The mean point value of the jobs performed by the blind is 129.1, while the mean on jobs done in general industry is 132.1.

The mean point value for the eight studied factors for both groups of jobs are:

	<u>Blind</u>	<u>General Industry</u>
Experience	37.8	31.9
Education	12.3	15.9
Initiative & Ingenuity	23.7	24
Mental or Visual Demands	17.3	14.8
Physical Demands	13.1	16.1
Spoilage of Materials	5.9	7.2
Work of Others	5.2	6.1
Hazards to Self	13.9	16.2

Only the two factors of Experience and Mental or Visual Demands (Alertness) demonstrate greater demands placed upon workers on jobs performed by the blind.

The jobs performed by the blind group closely around the mid portion of the total listing. Their standard deviation from the mean score is only 20.4, while the

industry. Again, 65.4% of jobs performed by the blind appear in the third quarter while 18.3% of general industry jobs appear. In the final quarter, 51.8% of jobs performed by the blind are found as compared to 19% of other jobs. This latter information indicates that there is no great overall difference between the two groups in terms of the type of jobs. The jobs from general industry, however, cluster at the two extremes, while the jobs performed by the blind cluster around the median degree of difficulty with respect to the total grouping.

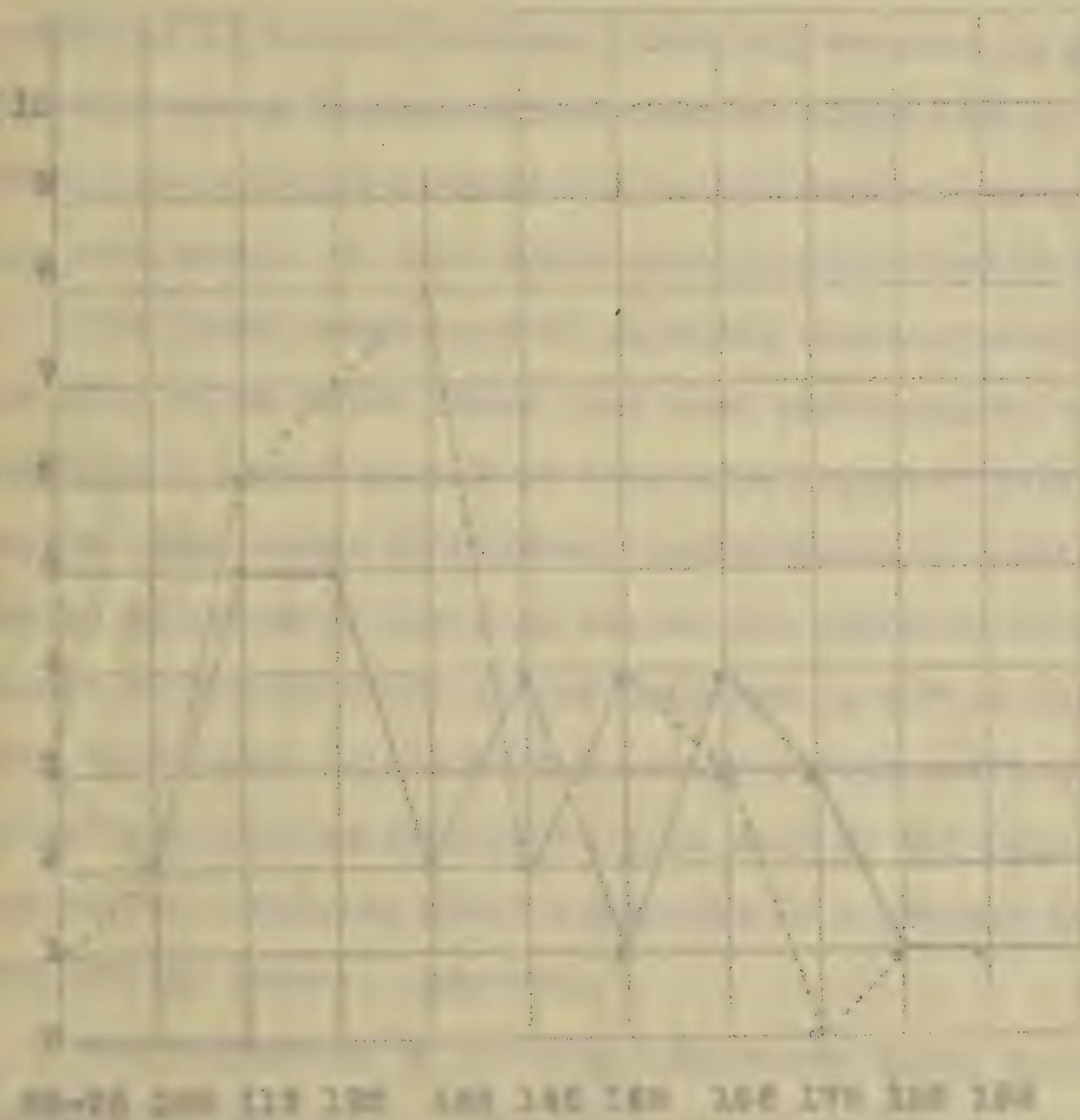
The mean point value of all jobs studied is 130.2. The mean point value of the jobs performed by the blind is 126.1, while the mean on jobs done in general industry is 132.1. The mean point value for the eight studied factors for both groups of jobs are:

General Industry	Blind	
31.7	37.8	Experience
10.9	15.1	Education
24	23.7	Instruction & Training
14.8	17.3	Health or Mental Condition
18.1	15.1	Physical Condition
7.8	8.9	Qualities of Work-life
6.1	5.2	Cost of Change
10.4	12.7	Attitude to Work

Only the two factors of Experience and Health or Mental Condition (differences) demonstrate greater demands placed upon workers on jobs performed by the blind.

The jobs performed by the blind group clearly stand out as being different from the total listing. Their standard deviation from the mean score is only 20.4, while the

standard deviation of the jobs in general industry is 27.7. The jobs from general industry distribute themselves more or less smoothly through the entire group. Figure XVI, Page 73, shows a graphic presentation of the distribution.



Line
General Industry

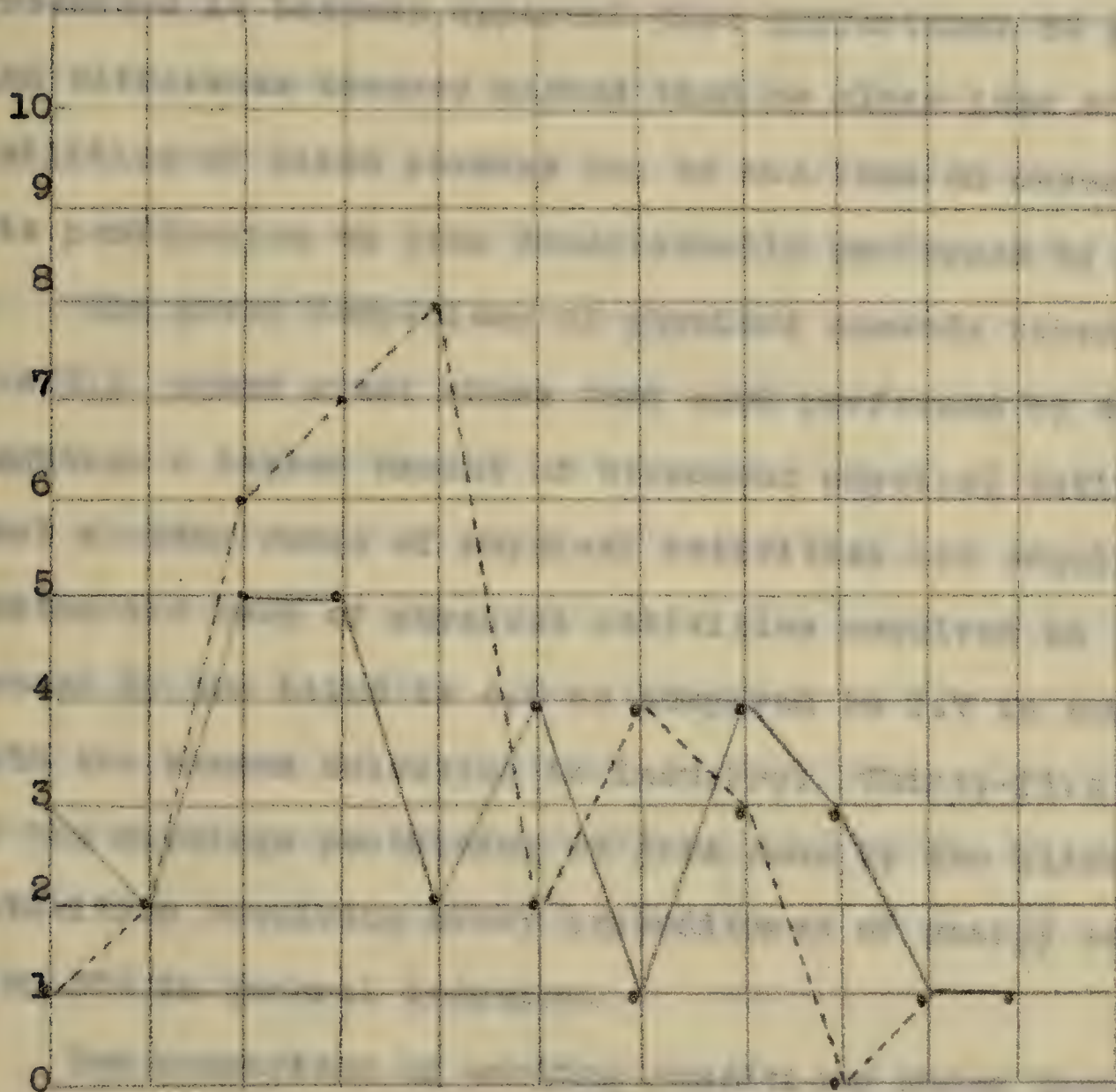
standard deviation of the jobs in general industry is 27.7.
The jobs from general industry distribute themselves more
or less normally through the entire group. Figure XVI,
Page 25, shows a graphic presentation of the distribution.

The distribution of the jobs in general industry is shown in Figure XVI, Page 25. The distribution is normal, with a standard deviation of 27.7. The jobs are distributed throughout the entire group, with a slight concentration in the middle. The distribution is shown in Figure XVI, Page 25.



FIGURE XVI

DISTRIBUTION OF JOBS ACCORDING TO FREQUENCY



85-95 105 115 125 135 145 155 165 175 185 195

Blind
General Industry

CHAPTER IX

GENERAL INDUSTRY, BY S. FINDINGS

The purpose of this study is to discover whether job demands are similar or dissimilar with respect to jobs performed by the blind and jobs performed in general industry. Comparison is made of job demands through use of United States Employment Service Job Analyses. From the material presented it becomes apparent that differences do exist. If the difference becomes marked then no clear idea of the abilities of blind persons can be had from an observation of his performance on jobs traditionally performed by the blind.

The group comparison of physical demands taken from the U.S.E.S. check sheet shows that work performed by the blind requires a lesser amount of strenuous physical activity and that a wider range of physical activities are required. The arithmetic mean of physical activities required on jobs performed by the blind is 4.5 as compared to 3.7 in connection with the random selection in industry. Thirty-five percent of the markings pertaining to jobs done by the blind indicate activities requiring heavy expenditures of energy as compared with 57% in general industry.

The comparison of working conditions shows that conditions surrounding the jobs performed by the blind are somewhat more favorable than those surrounding the jobs performed in general industry. The average number of conditions, chosen as ones which might involve unpleasant, hazardous or efficiency-reducing surroundings, appearing in connection with jobs in

RESULTS

The purpose of this study is to discover whether job demands are similar or dissimilar with respect to jobs performed by the blind and jobs performed in general industry. Comparison is made of job demands through use of United States Employment Service Job Analysis. From the material presented it becomes apparent that differences do exist. If the differences become marked then no class idea of the activities of blind persons can be had from an observation of his performance on jobs traditionally performed by the blind. The group comparison of physical demands taken from the U.S.E.S. check sheet shows that work performed by the blind requires a lesser amount of strenuous physical activity and that a wider range of physical activities are required. The arithmetic mean of physical activities required on jobs performed by the blind is 4.8 as compared to 5.7 in connection with the random selection in industry. Thirty-five percent of the material pertained to jobs done by the blind in less active jobs requiring heavy expenditures of energy as compared with 57% in general industry.

The comparison of working conditions shows that conditions pertaining to the jobs performed by the blind are somewhat more favorable than those pertaining to the jobs performed in general industry. The average number of conditions, shown as one when right tactile equipment, fasteners or efficiency-retaining surroundings, reported in connection with jobs in

general industry, is 2.0 as compared to 1.2 for jobs done by the blind. This may be of little significance since the working conditions check sheet was incomplete in many of the analyses and since many of the jobs performed by the blind had quite long lists of unpleasant, hazardous or efficiency-reducing working conditions. Thirty-six percent of the markings involved in jobs done by the blind would indicate efficiency reducing conditions, while 53% of the markings pertaining to jobs in general industry indicate such conditions.

On the assumption that a job requiring a greater number of characteristics to a higher degree requires a higher quality worker, the worker characteristics material was compared. It indicates that more versatile or more skilful workers are required on the jobs performed in general industry. When point values are assigned to the degree markings in connection with worker characteristics on the analyses, scores for the two groups of jobs can be compared. The average score for jobs performed by the blind is 35.5 while the average score for jobs from general industry is 42.5. The overall average is 38.3.

Learning time is a factor in the measurement of skill in all job evaluation. When the listed learning time or required experience for the two groups of jobs is compared, it shows that the jobs performed by the blind require an average time of 15.4 months experience before efficient production can be expected. The learning time on the jobs from general industry is 11.3 months. Using learning time

General industry, is 8.0 as compared to 1.3 for jobs done by the blind. This may be of little significance since the working conditions these men meet are inadequate in many of the analyses and since many of the jobs performed by the blind had quite low rates of unemployment, hazardous or efficiency-reducing working conditions. Thirty-six percent of the men were involved in jobs done by the blind would indicate efficiency-reducing conditions, while 52% of the men were performing jobs in general industry indicate such conditions.

On the assumption that a job requiring a greater number of characteristics to a higher degree requires a higher quality worker, the worker characteristics material was compared. It indicates that more versatile or more skilled workers are required on the jobs performed in general industry. These point values are assigned to the degree machine is connected with worker characteristics on the analysis, scores for the two groups of jobs can be compared. The average score for jobs performed by the blind is 30.3 while the average score for jobs from general industry is 45.8. The overall average is 38.8.

Learning time is a factor in the measurement of skill in all job evaluation. When the listed learning time on required equipment for the two groups of jobs is compared, it shows that the jobs performed by the blind require an average time of 15.4 months experience before efficient production can be expected. The learning time on the jobs from general industry is 11.3 months. Using learning time

as a measurement of skill and comparing it to worker characteristics, both measurements taken directly from U.S.E.S. Analyses, gives conflicting findings.

The material in Chapter VIII, which is compiled from collective judgments of qualified individuals, is more reliable since it is based on more than the opinion of one analyst. It is more useful in that numerical scores are obtained for each single job and the evaluations are based upon a study of eight different factors affecting job demands. The judgments are all obtained from similarly constructed data, and this data was in the form of full job descriptions rather than simple check lists. From the conversion of pooled judgments into numerical scores, an average score for jobs in industry is obtained. This score is used as a measuring standard against which to compare jobs performed by the blind, using the mean point score of jobs performed in general industry as a norm. The scores in connection with jobs performed by the blind deviate from minus 44.3 to plus 50.4, while the average score on jobs performed by the blind is 129.1 compared with 132.1 in general industry. Of the eight factors studied, Education, Experience, Initiative and Ingenuity, Mental or Visual Demand, Physical Demand, Spoilage of Materials, Work of Others and Hazards to Self, the numerical score in connection with jobs performed by the blind exceeds that from general industry only for Experience and Initiative and Ingenuity. All of the mean point scores for individual

as a measurement of skill and comparing it to various characteristics, both measurements taken directly from V.E.A. analysis, gives conflicting findings.

The material in Chapter VII, which is compiled from collective judgments of qualified individuals, is more reliable since it is based on more than the opinion of one analyst. It is more useful in that numerical scores are obtained for each sample job and the over-all scores are based upon a study of eight different factors affecting job demands.

The judgments are all obtained from similarly constituted data, and this data was in the form of full job descriptions rather than single check lists. From the comparison of pooled judgments into numerical scores, an average score for jobs in industry is obtained. This score is used as a measuring standard against which to compare jobs performed by the blind, using the mean point score of jobs performed in general industry as a norm. The scores in connection with jobs performed by the blind deviate from minus 44.3 to plus 30.4.

While the average score on jobs performed by the blind is 100.1 compared with 133.1 in general industry. Of the eight factors studied, Education, Experience, Initiative and Ingenuity, Mental or Visual Capacity, Typing Speed, Bookkeeping, and Mental Capacity, the mental capacity of blind individuals, both of blind and hearing to help, the mental capacity is measured with jobs performed by the blind exceeds that of general industry only for Experience and Initiative and Ingenuity. All of the mean point scores for individual

factors are only slightly different for the two groups of jobs.

The difference between demands on the two groups of jobs, in numerical terms, takes on an appearance of significance, which is not real. When the studied factors are graphically presented, the similarity of demands is more clearly seen. Figure XVII, Page 78, shows bar graphic comparisons of the measured demands.

Although the overall demands of jobs in the two groups are remarkably similar, individual jobs performed by the blind do vary markedly from the mean point value of jobs in general industry. When the mean score for jobs in industry is used as a constant, percentage deviation from the mean may be obtained for each job or class of jobs. When observations of a blind worker's performance are made on a job that is traditionally performed in the special workshops, a comparison of his work performance with what would be expected in industry can only be gained if his job is rated as to its comparative demands with respect to the average demands in industry. The several jobs performed by the blind are listed in Figure XVIII, Page 79 to show their point values, the numerical deviation from the mean value of jobs in industry and the loading factor that would have to be applied to any score obtained on the particular job so that it might be favorably compared with expectations in industry. Figure XIX, Page 80 shows similar scores, deviations and

Factors are only slightly different for the two groups of jobs.

The difference between demands on the two groups of jobs, in numerical terms, takes on an appearance of significance, which is not real. When the scaled factors are graphically presented, the similarity of demands is more clearly seen. Figure XVII, Page 78, shows the graphical comparisons of the measured demands.

Although the overall demands of jobs in the two groups are remarkably similar, individual jobs performed by the blind are very markedly from the mean point value of jobs in general industry. When the mean score for jobs in industry is used as a constant, percentage deviation from the mean may be obtained for each job or class of jobs. When observations of a blind worker's performance are made on a job that is traditionally performed in the general workforce, a comparison of his work performance with what would be expected in industry can only be gained if his job is rated as to its relative demands with respect to the average demands in industry. The several jobs performed by the blind are listed in Figure XVIII, Page 79 to show their point values, the numerical deviation from the mean value of jobs in industry and the loading factor that would have to be applied in any case selected as the particular job as it is made to be directly compared with expectations in industry. Figure XIX, Page 80 shows similar scores, deviations and

FIGURE XVII

GRAPHIC COMPARISON OF STUDIED JOB DEMANDS

Information taken from U.S.E.S. check sheets

Numerical Value
Norm equal .5

Physical Activities Requiring
Heavy Expenditure of Energy

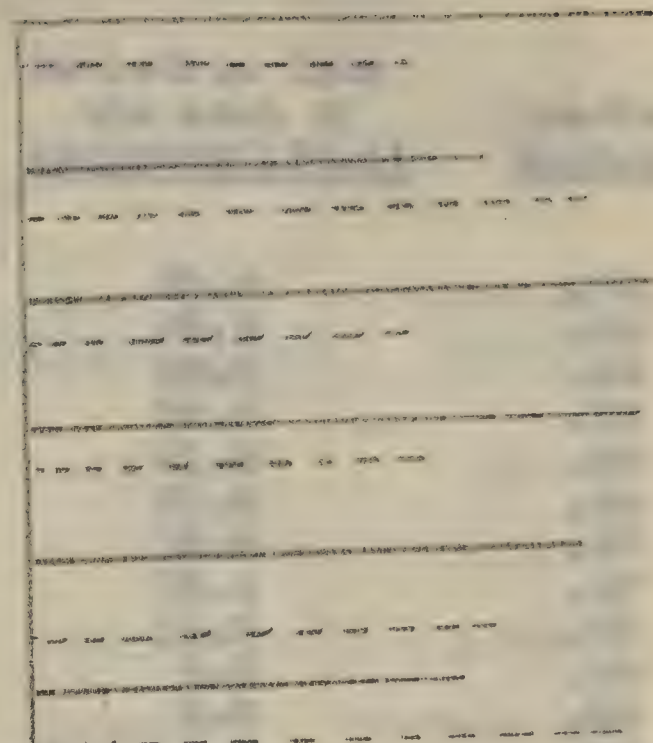
Variety of Physical
Activities

Average Number of Efficiency
Reducing Conditions

Percent of Efficiency
Reducing Conditions

Worker Characteristics

Learning Time



.620
.380
.452
.548
.625
.375
.596
.404
.545
.455
.422
.578

Information taken from point system ranking

Experience

Education

Initiative and Ingenuity

Mental or Visual Demand

Physical Demand

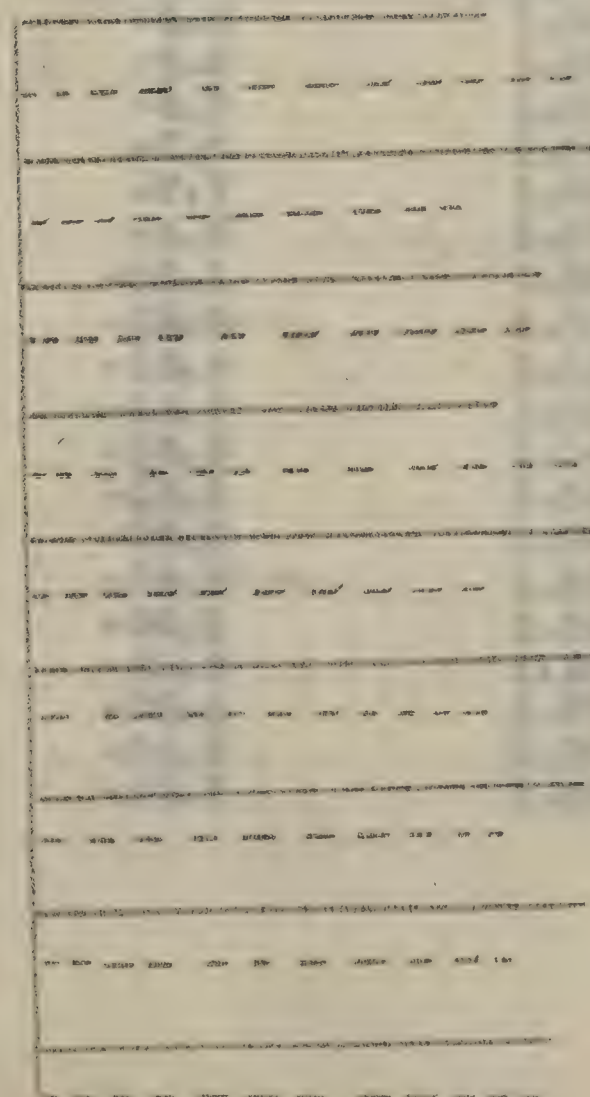
Spoilage of Materials

Work of Others

Hazards to Self

Total Point Score

Blind - - - - -
General Industry



.458
.542
.564
.436
.503
.497
.461
.539
.551
.449
.550
.450
.540
.460
.538
.462
.506
.494

Information types: point system managing

FIGURE XVIII

LOADING FACTORS TO BE APPLIED
WHEN COMPARING SPECIFIC JOBS PERFORMED BY THE BLIND
WITH AVERAGE EXPECTANCIES IN GENERAL INDUSTRY

<u>Job Title</u>	<u>Point Value</u>	<u>Deviation from the mean of Industry(132.1)</u>	<u>Loading Factor</u>
Garnett Machine Oper.	182.5	50.4	.72
Basket Maker (Baker)	160.6	28.5	.82
Basket Maker (Square)	160.6	28.5	.82
Basket Maker (Clothes)	158.1	26.0	.83
Hamper Maker #102328	153.9	21.8	.85
Chair Caner #013977	153.7	21.6	.85
Hamper Maker #102394	151.0	18.9	.87
Basket Maker #102229	150.5	18.4	.87
Basket Maker #102926	143.4	11.3	.92
Basket Maker #1400912	136.3	4.2	.96
Basket Maker (Fancy Gift)	134.3	2.2	.98
Tufting Machine #800802	133.9	1.8	.98
Broom Winder (Spec.Study)	133.8	1.7	.98
Weaver I, #600452	131.3	-.8	1.00
Tufter (Hand)	128.7	-3.4	1.02
Mattress Filler	127.7	-4.4	1.03
Sewer #900758	127.5	-4.6	1.03
Upholstery Sewer #140117	127.2	-4.9	1.03
Broom Winder #506705	124.5	-7.6	1.06
Suite Sewer #301531	124.4	-7.7	1.06
Cushion Sewer #301528	123.3	-8.8	1.07
Mop Sewer (Spec.Study)	122.0	-10.1	1.08
Sew.Mach.Oper.#800806	119.6	-12.5	1.10
Sew.Mach.Oper.#800804	118.7	-13.4	1.11
1st Class Sew.#503348	117.6	-14.5	1.12
Sewer #301610	113.8	-18.3	1.16
Weaver	113.5	-18.6	1.16
Chair Caner (Machine)	107.8	-24.3	1.22
Broom Sewer	107.6	-24.5	1.22
Mop Sewer #902521	106.0	-26.1	1.24
Chair Caner #013698	105.3	-26.8	1.25
Chair Caner #1213	104.0	-28.1	1.27
Mop Maker #902522	97.3	-34.8	1.35
Basket Maker #1100509	87.8	-44.3	1.50

PLANT LIST

LOCATIONS LISTED TO BE ADDED
 WITH COMMENTS IN LIST 1000 PREPARED BY THE BUREAU
 WITH AVERAGE ELEVATIONS IN FEET

Location	Altitude in feet	Notes	Remarks
17.	20.4	100.0	Washburn Station
18.	20.5	100.0	Washburn Station
19.	20.6	100.0	Washburn Station
20.	20.7	100.0	Washburn Station
21.	20.8	100.0	Washburn Station
22.	20.9	100.0	Washburn Station
23.	21.0	100.0	Washburn Station
24.	21.1	100.0	Washburn Station
25.	21.2	100.0	Washburn Station
26.	21.3	100.0	Washburn Station
27.	21.4	100.0	Washburn Station
28.	21.5	100.0	Washburn Station
29.	21.6	100.0	Washburn Station
30.	21.7	100.0	Washburn Station
31.	21.8	100.0	Washburn Station
32.	21.9	100.0	Washburn Station
33.	22.0	100.0	Washburn Station
34.	22.1	100.0	Washburn Station
35.	22.2	100.0	Washburn Station
36.	22.3	100.0	Washburn Station
37.	22.4	100.0	Washburn Station
38.	22.5	100.0	Washburn Station
39.	22.6	100.0	Washburn Station
40.	22.7	100.0	Washburn Station
41.	22.8	100.0	Washburn Station
42.	22.9	100.0	Washburn Station
43.	23.0	100.0	Washburn Station
44.	23.1	100.0	Washburn Station
45.	23.2	100.0	Washburn Station
46.	23.3	100.0	Washburn Station
47.	23.4	100.0	Washburn Station
48.	23.5	100.0	Washburn Station
49.	23.6	100.0	Washburn Station
50.	23.7	100.0	Washburn Station
51.	23.8	100.0	Washburn Station
52.	23.9	100.0	Washburn Station
53.	24.0	100.0	Washburn Station
54.	24.1	100.0	Washburn Station
55.	24.2	100.0	Washburn Station
56.	24.3	100.0	Washburn Station
57.	24.4	100.0	Washburn Station
58.	24.5	100.0	Washburn Station
59.	24.6	100.0	Washburn Station
60.	24.7	100.0	Washburn Station
61.	24.8	100.0	Washburn Station
62.	24.9	100.0	Washburn Station
63.	25.0	100.0	Washburn Station
64.	25.1	100.0	Washburn Station
65.	25.2	100.0	Washburn Station
66.	25.3	100.0	Washburn Station
67.	25.4	100.0	Washburn Station
68.	25.5	100.0	Washburn Station
69.	25.6	100.0	Washburn Station
70.	25.7	100.0	Washburn Station
71.	25.8	100.0	Washburn Station
72.	25.9	100.0	Washburn Station
73.	26.0	100.0	Washburn Station
74.	26.1	100.0	Washburn Station
75.	26.2	100.0	Washburn Station
76.	26.3	100.0	Washburn Station
77.	26.4	100.0	Washburn Station
78.	26.5	100.0	Washburn Station
79.	26.6	100.0	Washburn Station
80.	26.7	100.0	Washburn Station
81.	26.8	100.0	Washburn Station
82.	26.9	100.0	Washburn Station
83.	27.0	100.0	Washburn Station
84.	27.1	100.0	Washburn Station
85.	27.2	100.0	Washburn Station
86.	27.3	100.0	Washburn Station
87.	27.4	100.0	Washburn Station
88.	27.5	100.0	Washburn Station
89.	27.6	100.0	Washburn Station
90.	27.7	100.0	Washburn Station
91.	27.8	100.0	Washburn Station
92.	27.9	100.0	Washburn Station
93.	28.0	100.0	Washburn Station
94.	28.1	100.0	Washburn Station
95.	28.2	100.0	Washburn Station
96.	28.3	100.0	Washburn Station
97.	28.4	100.0	Washburn Station
98.	28.5	100.0	Washburn Station
99.	28.6	100.0	Washburn Station
100.	28.7	100.0	Washburn Station

FIGURE XIX

LOADING FACTORS TO BE APPLIED
WHEN COMPARING INDUSTRIES PERFORMED BY THE BLIND
WITH AVERAGE EXPECTANCIES IN GENERAL INDUSTRY

<u>Industry</u>	<u>Mean Point Value</u>	<u>Deviation from mean of Industry(132.1)</u>	<u>Loading Factor</u>
Mattress Making	143.2	11.1	.92
Basket Making	140.1	8.0	.94
Broom Making	121.9	-10.2	1.08
Machine Sewing	121.5	-10.6	1.08
Chair Caning	117.7	-14.4	1.12
Mop Making	108.4	-23.7	1.21

FIGURE 11

THIS FIGURE PRESENTS THE RESULTS OF THE ANALYSIS OF THE DATA OBTAINED FROM THE SURVEY OF THE AIR QUALITY IN THE AREA OF THE CITY OF NEW YORK, DURING THE PERIOD FROM 1960 TO 1969. THE DATA WERE OBTAINED FROM THE AIR QUALITY MONITORING STATIONS OPERATED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.

Location	Year	Mean Value	Standard Deviation
Manhattan	1960	1.1	0.2
Manhattan	1961	1.1	0.2
Manhattan	1962	1.1	0.2
Manhattan	1963	1.1	0.2
Manhattan	1964	1.1	0.2
Manhattan	1965	1.1	0.2
Manhattan	1966	1.1	0.2
Manhattan	1967	1.1	0.2
Manhattan	1968	1.1	0.2
Manhattan	1969	1.1	0.2

loading factors for jobs performed by the blind when they are grouped into particular industries. If numerical ratings are found on jobs performed in special workshops and are applied to the equation "job score : industrial average = 1 : loading factor" - or - "industrial average = job score x loading factor", then an average score for demands generally found in industry is obtained and comparison can be made.

These conclusions are based on the assumption that the U.S.E.S. narrative job descriptions are all uniformly good; that the sampling of jobs from general industry is sufficient for a fair study; and, that the technique used here gives a valid comparison. To gain an accurate evaluation, new, carefully prepared job analyses, including time and motion studies, would be needed. These studies would have to be obtained on a broad spread of industrial jobs and on all jobs done in special workshops. These would show work requirements to a degree impossible with the U.S.E.S. type of analyses. To gain a clear, accurate comparison of jobs now performed by the blind, regardless of where they are performed or regardless of the skill classification, a specially prepared factor comparison scale, with specially selected and validated factors and factor limitations, would be needed.

leading factors for jobs performed by the blind when they are grouped into particular industries. It is necessary ratings are found on jobs performed in special workshops and are applied to the question 'job rating: industrial average' 1: 'leading factor' - or - 'industrial average' for job rating 'leading factor', then an average score for results generally found in industry is obtained and comparison can be made.

These comparisons are based on the assumption that the U.S.A. representative job descriptions are all uniformly good; that the sampling of jobs from general industry is sufficient for a fair study; and, that the techniques used have given a valid comparison. To gain an accurate evaluation, now, carefully prepared job analyses, including time and motion studies, would be needed. These studies would have to be obtained on a broad spread of industrial jobs and on all jobs done in special workshops. These would show work requirements to a degree comparable with the U.S.A. type of analyses. To gain a clear, accurate comparison of jobs now performed by the blind, regardless of where they are performed or regardless of the skill classification, a specially prepared better comparison scale, with specially selected and validated factors and factor limitations, would be needed.

APPENDIX A

JOBS PERFORMED BY THE BLIND

Basket Maker (Market, Portable) - Schedule #102820

Makes market baskets, portable on wheels, from whole and shaved, unbleached rattan - the bottoms, sides, wheels and bolts are brought in complete.

Basket Maker - Schedule #1100509

Fits basket braid on form. Braid comes to basket maker ready to fit on form and he fits it and tacks band around top.

Basket Maker (Bakers) - Schedule #102875

Makes willow wicker into baskets, measuring 28" long, 16" wide and 16" high with bow handle across center.

Basket Maker (Clothes) - Schedule #102902

Makes willow wicker into baskets, measuring 36" by 20" by 14" deep, having handle at each end. Does conditioning, splitting and shaving of willow.

Basket Maker (Oval) - Schedule #102299

Makes oval and round willow baskets from prepared wicker.

Basket Maker (Square) - Schedule #102324

Makes square and rectangular shaped baskets, by hand, from conditioned willow wicker for commercial, industrial and domestic use.

Basket Weaver - Sides - Schedule #600452

Weaves rattan by hand to make sides of baskets.

Basket Maker - Schedule #1400912

Cuts basket bottoms, soaks and weaves reeds and willows into baskets and handles, dips baskets in glue and smooths for painting.

Basket Maker (Fancy Gift) - Schedule #102229

Weaves straw baskets for use in holiday trade. Baskets are made mostly from rice straw imported from Japan but some of the cheaper baskets are made from wood straw, a wood product resembling shavings but cut to an exact size.

Broom Sewer - Schedule #506706

Sews brooms on a broom sewing machine to provide a binding for upper portion of broom so that it will hold its shape.

APPENDIX 2
LIST OF ARTICLES BY THE NAME

Basket (baker) - Schedule 1101210
Baker's basket, portable, made of willow, from
whole and shaved, unbleached cotton - the bottom,
sides, wheels and bolts are brought in complete.

Basket (baker) - Schedule 1101210
This basket is made of willow. It is made to be
ready to fit on form and be like it and back
and around top.

Basket (baker) - Schedule 1101210
Baker's basket, portable, made of willow, from
whole and shaved, unbleached cotton - the bottom,
sides, wheels and bolts are brought in complete.

Basket (baker) - Schedule 1101210
Baker's basket, portable, made of willow, from
whole and shaved, unbleached cotton - the bottom,
sides, wheels and bolts are brought in complete.

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Basket (baker) - Schedule 1101210
Baker's basket, portable, made of willow, from
whole and shaved, unbleached cotton - the bottom,
sides, wheels and bolts are brought in complete.

Basket (baker) - Schedule 1101210
Baker's basket, portable, made of willow, from
whole and shaved, unbleached cotton - the bottom,
sides, wheels and bolts are brought in complete.

Broom Winder - Schedule #506705

Fashions a partially assembled broom by fastening the inside, shoulder and hurl (broom straws) onto the broomstick with steel wire.

Broom Winder - Special Study

Makes brooms for house and factory use with broom-winding machine, sorted broomcorn, wooden handles and wire.

Chair Caner (Hand) - Schedule #013977

Reseats or rebuilds the backs of broken or sunken caned chairs by reweaving strands of cane to the chair seat or back-rest frame, or by covering the frame with machine-pressed cane webbing.

Chair Caner (Machine) - Schedule #013690

Covers seats or backs of chairs, settees, or benches with pre-woven cane, rattan or similar material.

Chair Caner (Hand) - Schedule #1213

Weaves, or fabricates, by hand, strips of cane, or substitute, on to chairs to form seats or bottoms.

Chair Caner, Hand - Schedule #013698

Weaves strips of cane, rattan or similar material by hand in a standard design (open ventilated) to make seats and backs for chairs.

Cushion Sewer - Schedule #301528

Operates power sewing machine to sew top and bottom of a cushion cover to boxing.

Garnett Machine Operator - Schedule #200727

Lubricates, starts and stops Garnetting Machine; repairs and adjusts machine; removes rolls of garnetted or felted cotton from machine.

Hamper Maker (Motor Luggage) - Schedule #102364

Makes Willow Ware Hampers of all styles and sizes.

Hamper Maker - Schedule #102328

Makes Willow Ware Hampers from conditioned wicker, with and without lids for commercial, industrial and domestic use.

Mattress Filler - Schedule #403171

Lays up mattress filling, operates mattress filling machine and levels filling in the mattresses.

Green Shield - Schedule 100000
 Features a partially concealed screen by fastening
 the inside, inside and back (from screen) onto
 the framework with steel wire.

Green Shield - Schedule 100000
 This screen for house and factory use with green
 window machine, sorted screen, woven panels
 and wire.

Green Shield (Lined) - Schedule 100000
 Features or resembles the back of screen or screen
 and similar by fastening screen of wire to the
 inside seat or back-rest frame, or by covering the
 frame with machine-woven screen.

Green Shield (Lined) - Schedule 100000
 Covers seats or backs of chairs, sofas, or benches
 with pre-woven screen, woven or similar material.

Green Shield (Lined) - Schedule 100000
 Covers, or is covered, by hand, string of wire, or
 substitute, on the inside to form seats or backs.

Green Shield (Lined) - Schedule 100000
 Covers seats or backs of chairs, sofas, or benches
 with pre-woven screen, woven or similar material.

Green Shield (Lined) - Schedule 100000
 Features seats or backs of chairs, sofas, or benches
 with pre-woven screen, woven or similar material.

Green Shield (Lined) - Schedule 100000
 Features seats or backs of chairs, sofas, or benches
 with pre-woven screen, woven or similar material.

Green Shield (Lined) - Schedule 100000
 Features seats or backs of chairs, sofas, or benches
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Green Shield (Lined) - Schedule 100000
 Features seats or backs of chairs, sofas, or benches
 with pre-woven screen, woven or similar material.

Mop Sewer - Special Study

Sews mops by binding them with cloth tape using a #7-44 Double Needle Singer Sewing Machine.

Mop Head Sewer - Schedule #902521

Sews narrow strips of printed cloth tape previously pinned across the middle of cut-to-length bundles of cotton yarn to the bundle.

Mop Maker - Schedule #902522

Nails 55 to 65 mopheads onto the end of wooden mop handles per hour. Inserts small nail thru metal washer and with hammer, nails strip of cloth and strands of yarn to end of mop handle.

1st Class Power Sewing Machine Operator - Schedule #503348

Sews bindings on blankets so they will have a finished appearance, using table model type machine with two needles, sewing a double interlock stitch.

Sewer - Schedule #900758

Using power sewing machine, stitches pieces of ticking together to form a tick.

Sewing Machine Operator - Schedule #800804

Stitches and quilts side pieces; sews mattress inner ticks; operates Eyelet Machine; operates Ventilator Machine.

Sewing Machine Operator - Schedule #800806

Sews side strips, top and bottom panels of mattress ticks and couch and chair covers together to form completed ticks and upholstery covers, performing such operations with an electric sewing machine, heavy duty, factory type.

Sewer - Schedule #301810

Operates power sewing machine which sews and cuts beef bags into various predetermined lengths.

Suite Sewer - Schedule #301831

Operates power sewing machine and sews welts into suite coverings.

Tufting Machine Operator (Manual) - Schedule #800802

Places a mattress on the bed of Manual Tufting Machine; operates the machine by hand to place tufting loops with buttons on each end through the mattress.

Tuffer - Schedule #1500153

Tuffer locates position of tufts on mattress; sews (by hand) tufting thread in place; places cotton tufts under tufting thread; ties tufts in place.

Upholstery Sewer (Studio Couches)- Schedule #1401177

Operates powered sewing machine, sewing together pieces of material used in covering "base" mattress, and cushion covers of studio couches so they can be upholstered.

Weaver - Schedule #1500211

Entwines wooden splints forming basket patterns so that woven sheet formed will be used by Basket Maker in making baskets.

7-12-44 - 10:00 AM - 10:15 AM
 After leaving station at 10:15 on Saturday, new
 (by hand) being turned in place; place action
 into main filling trench; also into place.

7-12-44 - 10:15 AM - 10:30 AM - 10:45 AM
 Gravel covered road machine, machine
 place of material and in covering "new" surface,
 and machine covers at studio corner as they can be
 finished.

7-12-44 - 10:45 AM - 11:00 AM
 Machine worked again turning main surface
 as that work was done will be used by 11:00 AM
 work in main trench.

JOBS PERFORMED IN GENERAL INDUSTRY

Belt Sander Operator - Schedule #900685

Operates a machine for producing very smooth surfaces on boards.

Blanching-Machine Operator - Schedule #103950

Operates blanching machine and feeds soaked vegetables into hopper of machine.

Bone Drier Operator - Schedule #1201739

Operates a large revolving drying oven; supervises the operation of screening equipment and the unloading of the pressure tanks.

Buffer III - Schedule #504510

Scours heels of unfinished shoes by means of a scouring machine to remove roughness

Candy Coater (Chewing Gum) - Schedule #600955

Coats naked gum tablets with syrup and flavor.

Colorer (Finishing) - Schedule #603406

Spreads a paint-like fluid on tanned leather skins with a plush brush.

Cushion Builder - #A-88

Builds seat cushions, both large and small and side arms.

Doughnut-Machine Operator - Schedule #501187

Bakes doughnuts in doughnut machine and prepares dough for same; kneads dough for rolls; prepares puff paste dough.

Drop Hammer Operator - Schedule #700722

Operates steam forging hammer so that billets can be hammered into forgings.

Edge Wire Former - Schedule #1200672

Adjusts peg stops on form frame, bends wire around pegs according to specifications and joins wire ends together with nipple.

Embosser - Schedule #804451

Puts grain finish on hides in imitation of natural grain of various kinds of leathers.

APPENDIX 2

THE HISTORY OF THE PROJECT

First Project - 1964
The first project was a study of the
effect of the project on the
the project.

Second Project - 1965
The second project was a study of the
effect of the project on the
the project.

Third Project - 1966
The third project was a study of the
effect of the project on the
the project.

Fourth Project - 1967
The fourth project was a study of the
effect of the project on the
the project.

Fifth Project - 1968
The fifth project was a study of the
effect of the project on the
the project.

Sixth Project - 1969
The sixth project was a study of the
effect of the project on the
the project.

Seventh Project - 1970
The seventh project was a study of the
effect of the project on the
the project.

Eighth Project - 1971
The eighth project was a study of the
effect of the project on the
the project.

Ninth Project - 1972
The ninth project was a study of the
effect of the project on the
the project.

Tenth Project - 1973
The tenth project was a study of the
effect of the project on the
the project.

Eleventh Project - 1974
The eleventh project was a study of the
effect of the project on the
the project.

Felting Machine Operator - Schedule #204868

Cuts to length and removes felt strip rolls discharged from the felting machine.

Folder III - Schedule #901153

folds and pins cotton dresses in such a way as to prevent them being wrinkled in handling.

Flour Sifter - Schedule #601726

Dumps different grades of flour into hopper from which it is taken to a machine which mixes the different grades into a blend; or when bolting only one type of flour he feeds it to a sifter.

Fur Cutter - Schedule #203373

Removes the fur from the pelt for blowing purposes; cuts or shreds stripped pelt for shipment and salvage.

Ham Cutter - Schedule #603397

Separates ham from half carcass. Cuts flesh of the thigh around spot where Ham scriber made saw-cut through thigh bone.

Heel Scorer - Schedule #302789

Operates Heel Scoring Machine which marks a line by making an incision across the heel seat of the felt insole.

Helical Spring Machine Operator - Schedule #505914

Makes wire coil springs of varied diameters and lengths with automatic machines.

Inspector (Felt Hat) - Schedule #102992

Inspects felt hats and packs them in cardboard packing boxes.

Ironer (Crown) - Schedule #203322

Puts hats on spindle; dampens hats with water; irons crowns.

Machine Molder, Stripping Plate - Schedule #400831

Pans sand around a pattern in a flask, the pattern being arranged so that by means of levers at each end of the machine, it can be drawn down, out of the mold, into the base of the machine.

Operator, Chucking Machine - Schedule #700899

Brings stock to machine, places proper size chuck on machine, inserts stock in machine, removes same and places on hand truck. Measures cut to see that it is cut to proper size.

Exhibit 111 - Robert's Will
John and Jane's action was in such a way as to prevent their being entitled to benefits.

[illegible]

THE LIAISON - Liaison is the link between the two groups, the one on the left and the one on the right. It is the one who is in touch with both and who can pass on the information from one to the other. It is the one who is in touch with both and who can pass on the information from one to the other.

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 subject's file with subject

SECRET - (S) (U) (C)

SECRET - (S)

Page 2

There are no other copies of this document.

Machine No. 1 - 1000 lbs. capacity
Machine No. 2 - 1000 lbs. capacity
Machine No. 3 - 1000 lbs. capacity
Machine No. 4 - 1000 lbs. capacity
Machine No. 5 - 1000 lbs. capacity
Machine No. 6 - 1000 lbs. capacity
Machine No. 7 - 1000 lbs. capacity
Machine No. 8 - 1000 lbs. capacity
Machine No. 9 - 1000 lbs. capacity
Machine No. 10 - 1000 lbs. capacity

is out to prove this. Please on hand from. However let us see that it machine, insert stick in machine, remove same and U.S. stick to machine, please proper stick stick on

Pole Machine Helper - Schedule #900495

Operates levers controlling the dogs on the pole machine.

Power Shear Operator 1 - Schedule #208223

Adjusts and operates two shearing machines to cut rectangular sheets of metal of various gauges into rectangular shapes as required.

Resin Bin Loader - Schedule #1302677

Keeps all resin bins full to take care of demands of Cooking Dept.

Silverer (Mirror) - Schedule #606597

Supervises Silvering Department in which sheets of glass are washed, silvered and painted before being cut into mirrors. Mixes silvering solution which is applied to the glass in order to deposit a coat of metallic silver on it.

Slack Barrel Inspector - Schedule #600489

Makes visual inspection of slack barrels at end of line before being finally nailed together.

Stock Clerk (Baker) - Schedule #301953

Is responsible for all operations in storeroom, including receiving of supplies, sifting and blending of flour, mixing and weighing of ingredients.

Tube Machine Operator III - Schedule #205143

Operates and sets up Extruding Machine used for making long, round strips of mixed rubber. Cuts strips into 42 inch lengths and lays them on trays.

Turret-Lathe Operator, Automatic - Schedule #1203176

Tends machine which rapidly produces duplicate door lock parts by presenting a number of tools in sequence to the work which is clamped in the revolving chuck.

Water-Wangle Operator - Schedule #Va.-205

Operates a machine to moisten and press cloth prior to its passage through a tenter frame which straightens the filling in the cloth. Tends the machine to keep a continuous strip of cloth passing through it.

1. Machine No. 1 - Machine No. 1
The machine is used for the purpose of
making the paper into sheets of various sizes.

2. Machine No. 2 - Machine No. 2
The machine is used for the purpose of
making the paper into sheets of various sizes.

3. Machine No. 3 - Machine No. 3
The machine is used for the purpose of
making the paper into sheets of various sizes.

4. Machine No. 4 - Machine No. 4
The machine is used for the purpose of
making the paper into sheets of various sizes.

5. Machine No. 5 - Machine No. 5
The machine is used for the purpose of
making the paper into sheets of various sizes.

6. Machine No. 6 - Machine No. 6
The machine is used for the purpose of
making the paper into sheets of various sizes.

7. Machine No. 7 - Machine No. 7
The machine is used for the purpose of
making the paper into sheets of various sizes.

8. Machine No. 8 - Machine No. 8
The machine is used for the purpose of
making the paper into sheets of various sizes.

9. Machine No. 9 - Machine No. 9
The machine is used for the purpose of
making the paper into sheets of various sizes.

APPENDIX C

SAMPLE OPENING PAGE OF POINT EVALUATION MATERIAL

PHYSICAL DEMAND

The degree of physical demand is sought. Consideration should be given to the relative amount and the continuity of the physical exertion inherent in the job as it is done, and also to the physical position for standing, sitting and lifting.

1st Degree: Requires little physical exertion. Comfortable position.

2nd Degree: Working with light weight material, or occasionally with average weight material which requires only light physical exertion, or operating machines where machine time is greater than handling time.

3rd Degree: Working with light or average weight materials during majority of work period, or continuous activity such as running several machines where the handling time is approximately equal to machine time. Above normal physical exertion required.

4th Degree: Working with average or heavy weight material requiring considerable effort, severe physical strain for intermittent periods of short duration or continuous strain of difficult work position.

5th Degree: Working with heavy material requiring continuous physical exertion. Continuous physical strain or intermittent extra-ordinarily severe strain.

Basket Maker (Market, Portable) 0....1....2....3....4....5
Schedule #102926

Basket Maker 0....1....2....3....4....5
Schedule #1100509

Basket Maker (Bakers) 0....1....2....3....4....5
Schedule #102875

Basket Maker (Clothes) 0....1....2....3....4....5
Schedule #102902

Basket Maker (Oval) 0....1....2....3....4....5
Schedule #102299

APPENDIX I

TABLE I. PHYSICAL DEMANDS OF THE JOBS

TABLE I. PHYSICAL DEMANDS OF THE JOBS

The degree of physical demand is judged by the amount of time spent in the various physical activities and the intensity of the physical exertion involved in the job as it is done, and also in the physical position for standing, sitting and leaning.

1st Degree: Working with light weight material, or occasionally with average weight material which is not heavy.

2nd Degree: Working with light weight material, or occasionally with average weight material which is not heavy. Working with light weight material, or occasionally with average weight material which is not heavy.

3rd Degree: Working with light or average weight material, or occasionally with average weight material, or occasionally with average weight material, or occasionally with average weight material.

4th Degree: Working with average or heavy weight material, or occasionally with average or heavy weight material, or occasionally with average or heavy weight material.

5th Degree: Working with heavy weight material, or occasionally with heavy weight material, or occasionally with heavy weight material.

6th Degree: Working with heavy weight material, or occasionally with heavy weight material, or occasionally with heavy weight material.

7th Degree: Working with heavy weight material, or occasionally with heavy weight material, or occasionally with heavy weight material.

8th Degree: Working with heavy weight material, or occasionally with heavy weight material, or occasionally with heavy weight material.

9th Degree: Working with heavy weight material, or occasionally with heavy weight material, or occasionally with heavy weight material.

10th Degree: Working with heavy weight material, or occasionally with heavy weight material, or occasionally with heavy weight material.

APPENDIX D
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